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INTRODUCTION TO A SERIES OF ARTICLES BY HERBERT I. MARGOLIS

EVIDENTLY, the task of the orthodontist is to guide the progressing organism out of pathologic growth ruts into some new direction of development which will permit healthy functioning and a harmonious relationship of the teeth to each other and to the face in general. He brings to this task the ability to distinguish between adequate development and functioning and the reverse, between symmetrical beauty and distorted ugliness. To this initial equipment he adds a marvelous skill in moving teeth by ingenious mechanical contrivances.

But this is what the orthodontist ought to know: (1) the exact relations of the bony and soft parts of the head and face to a "normal" development at every age from infancy to maturity and for at least several hereditary patterns of facial and cephalic structure; (2) the functional and nutritional agencies which distort into pathologic channels the normal growth patterns of various facial types; (3) the biochemical and physiologic means of combating or correcting these pathogenic agencies; (4) the precise effect of manipulating one group of variables (the teeth) upon the aggregate of variables which comprise the biologic entity (bony parts, soft parts, etc.).

Now an adequate knowledge of (1) and (4) can be gained through the employment of Dr. Herbert Margolis' marvelous technique of study. I have watched the development of his methods and apparatus for many years, and it now satisfies every scientific requirement known to me. It combines precision with ease of application and comparative simplicity of device. It is not my purpose here to compare the Margolis method with the admirable technique and method developed by Broadbent. Both are oriented toward the same needful end.

I wish, however, to assert with all possible emphasis and with complete conviction that the transformation of orthodontia from an art to a science waits upon the adoption of methods of study, diagnosis, and accurate recording such as have been originated by these great pioneers. While it is perfectly obvious that requisites (2) and (3) must be fulfilled before we can combat the basic causes of malocclusion, I am quite sure that (1) and (4) provide the accurate observational foundation for progress on the biochemical and physiologic lines.

To Dr. Margolis who has striven without assistance or encouragement, and to Dr. Broadbent whose achievements have not yet received their just meed of appreciation, I can only say tritely but sincerely, "A prophet is not without honor, save in his own country."

Earnest A. Hooton,
Professor of Anthropology,
Harvard University.

A PLASTIC AND GRAPHIC TECHNIQUE FOR RECORDING DENTAL CHANGES AND FACIAL GROWTH

HERBERT I. MARGOLIS, D.M.D.,* BOSTON, MASS.

CLINICAL orthodontics is the mechanical interpretation of tooth movement on a biologic base. It is in the realm of biomechanics. The science of orthodontics rests on the tripod of biology, physics, and technique. Its contribution to society should rank among the foremost in dentistry and medicine. For, when a distorted set of teeth is successfully corrected, not only are the facial appearance and dental functions of the child affected, but also the entire mental outlook of that adult-to-be may be altered.

Therefore, every conscientious orthodontist wants to learn as much as possible from each effort and transmit his experience to his colleagues.

However, the usual records, namely, casts of the teeth, unrelated to the head, photographs, not standardized, and x-rays of individual teeth, have little significance as to the actual facial dental changes that took place during the orthodontic treatment. They are inadequate as a basis for experience. It is true that there have been keen intuitive minds, and, in some cases, good guessers. But it would serve the profession and our patients much better if the changes effected during growth or orthodontic interferences could be accurately recorded.

Such records could serve as a common means for discussion, and as a basis for experience, from which older practitioners could profit in retrospect. Younger practitioners, too, would depend less on statements based on authority and more on scientific information.

The writer some years ago was impressed with the lack of information in the usual records. He felt, as Johan Hjort, that "in all human activity when problems make the worker pause to see if his tools or instruments are in order."

With the aid of many friends in allied fields he decided to forge his own tools and, as Bacon urged, "seek the true helps."

The objective was to put on paper, as precisely as possible, a three-dimensional picture in detail of the sphere of activity that the orthodontist was concerned with at a given time.

The problem was not an easy one. In 1925 a paper was published by the author in the INTERNATIONAL JOURNAL OF ORTHODONTIA, entitled "An Improved Technic for Making Facial Casts with Dental Inserts." That process was a laborious procedure.

From then on it was a matter of reduction of unnecessary phases, increase in accuracy, and inclusion of more pertinent data. There was ever present

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the urge to learn more about the intricacies of growth changes and modification induced by orthodontic therapy in those youngsters entrusted in his care.

He understood the spirit that moved Leonardo di Vinci to say that "those who devote themselves only to study of learned works instead of gaining knowledge with their own eyes of the works of nature, are not the sons but the grandsons of nature, theirs is second-hand experience."

Another paper by the author was published in the INTERNATIONAL JOURNAL OF ORTHODONTIA, September, 1934, entitled "Facial-Dental Casts and Records. A Preliminary Report."

However, the progress was of necessity slow, for it had to be dovetailed into a busy practice unaided by the obvious advantages of an institution.

As soon as a phase was apparently complete, a means for simplification or increase of accuracy suggested itself. Then came the need for stern discipline to discard the old and retain only the essential to a better plan. Hence the delay in writing.

The writer acknowledges his debt of gratitude to Earnest A. Hooton, Professor of Anthropology at Harvard, for his friendly understanding and encouragement.

The desire to record prompted by requests from friends asserted itself. The following series of articles to be presented in this JOURNAL will include:

1) a standardized technique for stereoscopic photography.

2) a procedure for x-ray cephalographics.

3) a procedure for construction of oriented dental casts and three-dimensional charts obtained therefrom to determine, with precision, and in detail, the changes in any part of the entire dentition.

Every case presented to the orthodontist regardless of its apparent simplicity should include standardized x-rays of the head as well as standardized photographs together with the usual x-rays and models. These records are very easily obtained by an office assistant, and the most simple case may, in retrospect, afford the most striking information of the influence of natural growth or orthodontic achievement.

The oriented casts may be constructed in selected cases.

Under standardized stereoscopic photography will be described the method for obtaining and viewing three-dimensional photographs. These records are comparative to the facial cast which took many hours and was hard on the child as well as the operator.

With proper mounting in a suitable stereoscope, stereograms of the same individual taken at different intervals can be mounted on one card and viewed simultaneously. Thus is obtained the conditions as though the child's head before treatment and after treatment were both side by side for the operator to study.

The operator will find this fascinating comparative three-dimensional study much more interesting and of greater value than two-dimensional photographs (Figs. 1*A* and *B*, Fig. 2).

Under the heading of x-ray cephalographics will be described the means for locating the central ray with precision in a very few seconds. Also the apparatus for fixation of the head, the adjustable cephalostat, will be described. Not only can the usual profile and posteroanterior x-ray cephalogram be obtained with the aid of this instrument, but it is interesting to note that x-ray pictures may be constructed with the head at any desired angle to the central ray. Thus it is possible in routine practice to obtain extraoral jaw x-rays taken with the same precision and despatch that profile x-rays are taken. The advantage of this type of film over the usual extraoral film with its distortions should be obvious at once.

Fig. 1*A*, Case L. K.—Profile stereograms taken Dec. 20, 1937, before treatment. All stereograms must be viewed through the stereoscope for three-dimensional effect.

Fig. 1*B*, Case L. K.—Profile stereograms taken June 30, 1939, after treatment. See Fig. 2 for composite.

Also under x-ray cephalographics will be described the means for projecting on paper the desired areas of the x-ray film. Instead of the usual method of placing the film on an illuminating box, then placing a paper over the x-ray film for tracing, the author has designed a projector which, by means of a series of optical flat mirrors and a system of specially surfaced lenses, projects

the x-ray negative directly on the drawing paper. The tracing can then be done simply without any medium between the eyes and the film. Thus, checking the accuracy of the tracer becomes a very simple and accurate task.

The description of the oriented dental cast will be essentially the same as that given in the article mentioned above, with the exception that the pantograph has been discarded. In its place a system of indirect projection is used which eliminates the tedious work of the previous instrument. By means of optical flat mirrors, detailed and precise changes of the dentition may be recorded in three dimensions (Fig. 3).

Since the orthodontist is concerned in many cases with slight axial changes in all planes, it would be most enlightening if such precise studies of tooth movement were carried in large numbers by institutions having proper facilities.

The author does not suffer any illusion that the procedures to be described nor the apparatus will be adopted entirely by the profession. In fact, he would rather that any one inclined to increase his system of records will take what he wishes of the author's material and improve it, adding something of himself in the process.

Fig. 2.—Case L. K.—Composite profile stereograms before and after treatment mounted together. When viewed through the stereoscope, it affords a comparative study of the changes in contours obtained from the composite of Figs. 1*A* and *B*.

There is, however, the desire to pass on the results of much effort and the hope that everyone practicing orthodontics will increase his clinical records, not necessarily to discover "laws," but rather to increase his perspective and check on each other's claims.

At any rate, his younger associates will not be impressed by horn-rimmed spectacles or stroking of beards but can look up the records and learn thereby.

STANDARDIZED STEREOSCOPIC PHOTOGRAPHY

This phase of the work was the last to be developed, yet it seems best to describe it first.

For years the writer felt that photography was the least important. The profile x-rays offered a good outline of the soft tissue, and that was deemed sufficient.

However, after recording the changes in dentition of a little patient, obtained from oriented dental casts, he was impressed with the great amount of development in the anterior segments of both jaws, as indicated by the charts (Fig. 3). The photographs were referred to (Figs. 4*A* and 4*B*). These certainly

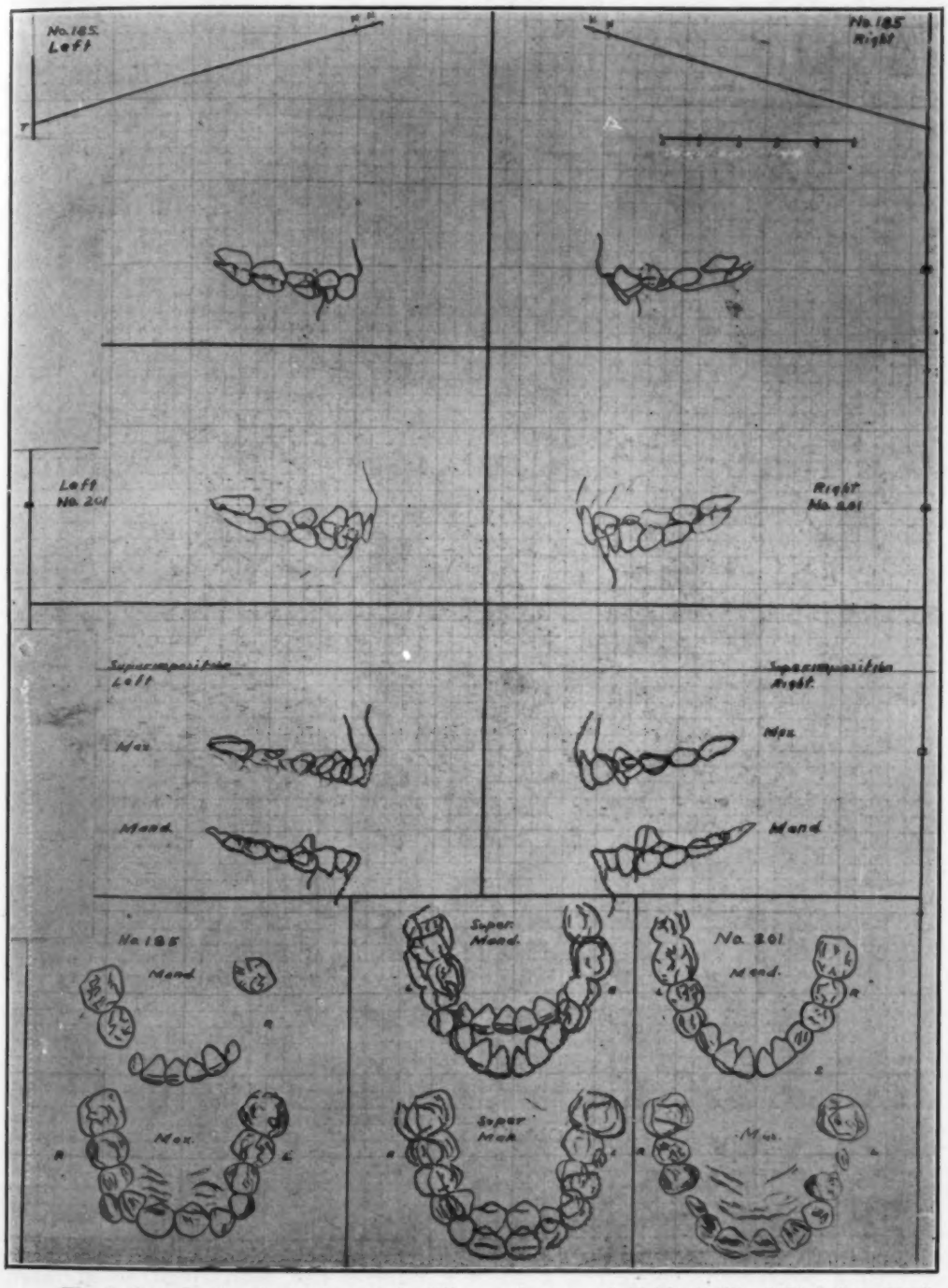

Fig. 3, Case R. G.—Projections of dentition of the same individual (No. 185) before treatment; (No. 201) after treatment. When superimposed No. 201 is represented by the dotted line. The method for obtaining these records will be described under "Oriented Dental Casts." For photographs of this case see Figs. 4*A* and *B*.

evidenced considerable change in that area of the face, but the photographs were not at all standardized. It was obvious, then, if reference must be made to photographs, they should be accurately constructed.

The usual two-dimensional (single plane) photograph is not a true perspective. It is an image as only one eye would see the object.

Stereoscopic photography, on the other hand, shows the object as the observer would see it with both eyes. Fixing the component factors further permits for comparisons.

Fig. 4*A*, Case R. G.—Photograph taken Jan. 29, 1935, before orthodontic treatment. See Fig. 3, No. 185.

Fig. 4*B*, Case R. G.—Photographs taken March 20, 1937, after treatment. See Figs. 3, No. 201, and 4*A*. Single plane photographs, not stereoscopic and not standarized, therefore, not true perspective and not comparative.

STABILIZATION OF PATIENT'S HEAD IN VARIOUS POSITIONS

In a convenient corner of a room a cubicle has been constructed large enough to permit one individual to sit down comfortably on a modified dental chair. A head fixator or cephalostat is rigidly attached to the rear wall (Fig. 5).

The cephalostat consists of a horizontal circular slide which permits of rotation of 360 degrees on the horizontal plane. To the under surface of the lower disc is an additional precision slide having two arms each capable of being moved independently on the fixed slide. To these arms are fixed short ear rods (Fig. 6).

This feature of having the ear rod arms move independently of each other makes it possible to have the profile of the patient always in the same relative position regardless of the size of the head.

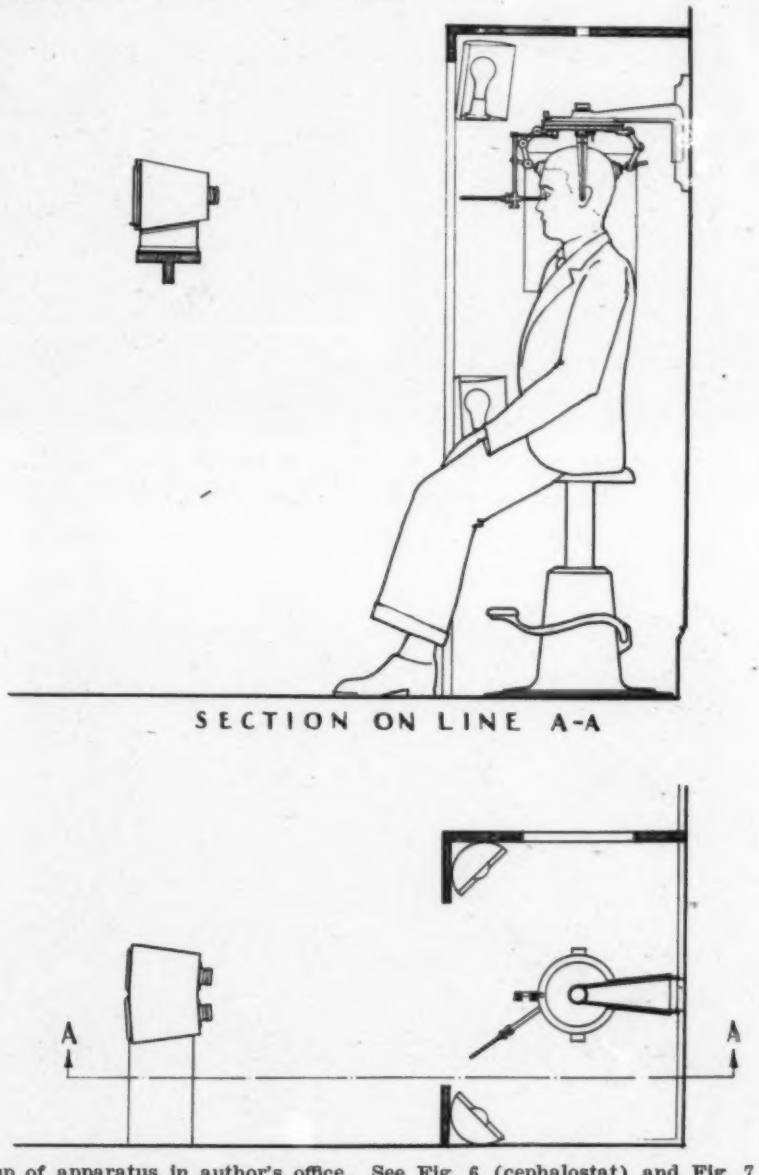

Fig. 5.—Setup of apparatus in author's office. See Fig. 6 (cephalostat) and Fig. 7 (camera). Patient in cubicle, for profile stereogram (Fig. 1).

Also there is the advantage of two short sturdy rods to enter and support the auditory tubes.

Attached to the posterior part of the cephalostat is an adjustable rubber head rest. To the anterior part on the same plane as the ear rods is a pointer

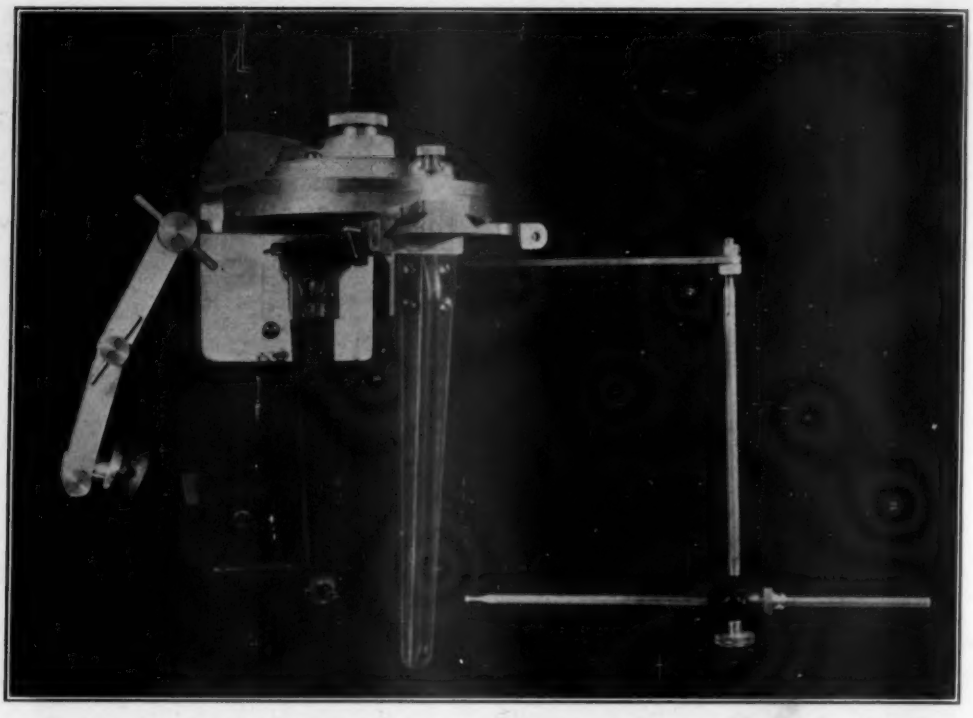

Fig. 6.—Cephalostat or head fixator. Movable arms with short ear rods on precision calibrated slide. A calibrated circular slide permits the lateral and profile views. Pointer establishes horizontal plane and an adjustable rubber head rest. See Figs. 5, 9, and 10.

Fig. 7.—Stereocamera on fixed attachment, matched lenses, fixed focus. Always in the same relation to the patient. See setup in Fig. 5.

to locate the inferior border of the left orbit, thus setting the patient's head on the Frankfort horizontal plane (Figs. 5 and 6).

In this cubicle there is attached rigidly the lighting the operator desires. In this case the fixed lighting equipment consists of four aluminum reflectors of the proper convexity, two above and two below the patient's head. The light globes above have 100 watts each, and below, 50 watts each.

The entire cubicle can be painted to give the background the operator wishes.

The patient is seated on a chair in this cubicle, the head fixed in the cephalostat on the horizontal plane (Fig. 5).

The manner of adjusting the patient is as follows: Before placing the child in the cubicle, the intra-auditory distance is measured with a pair of calipers (Fig. 8). This the child permits as the head is not in a rigid appliance and is free. Having obtained the measurement, the child is seated in the cubicle, one ear rod is set at one-half the distance and the gib is tightened. The child's head is gently adjusted so that the fixed ear rod enters its respective auditory tube, then the other ear rod slide is moved to the same correlated distance as the fixed rod, as determined previously with the calipers.

Fig. 8.—Intra-auditory distance taken of patient with calipers to facilitate the setup in cephalostat.

By taking the measurements first, the operator does not depend entirely on the child when in the cephalostat. He knows beforehand exactly how far into the auditory tube he wishes to enter.

When the ear rods are in position the head is raised or lowered as the case may be until the pointer indicates the head to be on the Frankfort horizontal plane.

Then the head rest is quickly adjusted for support.

The instrument may be rotated in this adjustable cephalostat so that front and profile views may be taken (Figs. 9 and 10).

THE CAMERA

The stereocamera in this technique is of fixed focus design and requires no adjustments. It is merely a box with matched corrected lenses of adequate focal length. These lenses (Zeiss) are corrected for color, aberration, and depth of field (Fig. 7).

The image obtained on the film is reduced to one-fourth the size of the object on a 3¼″ × 4¼″ film.

The stereoangle has its vertex on the object in the center of the depth of focus of the lenses.

From the following general equations any camera may be designed to fit special requirements.

From the optical equation:

$$\frac{1}{u}+\frac{1}{v}=\frac{1}{f}$$

Fig. 9*A*, Case T. F.—Anterior stereograms taken Jan. 4, 1938, before treatment. See Fig. 9*B*.

Fig. 9*B*, Case T. F.—Anterior stereograms taken June 30, 1939, after treatment. All stereograms must be viewed through the stereoscope for three-dimensional effect. See Fig. 9*A*.

Where:

f = focal length of lens
u = image distance
v = object distance

Where object was assumed as 12″ cube, divided by 4, gives 3″ as width of film.

The film used was of a size to fit the stereoscope as well as lantern slide projectors conveniently and to give standardization of reduction. The stereo-angle is 7 degrees.

Where:

m = magnification

$$m = \frac{u}{v} = \frac{1}{4}$$

This camera rests on a precision slide, can be removed and replaced with no measurable change in position, or it may be left fixed without removal.

Fig. 10*A*, Case T. F.—Profile stereograms taken Jan. 4, 1938, before treatment.

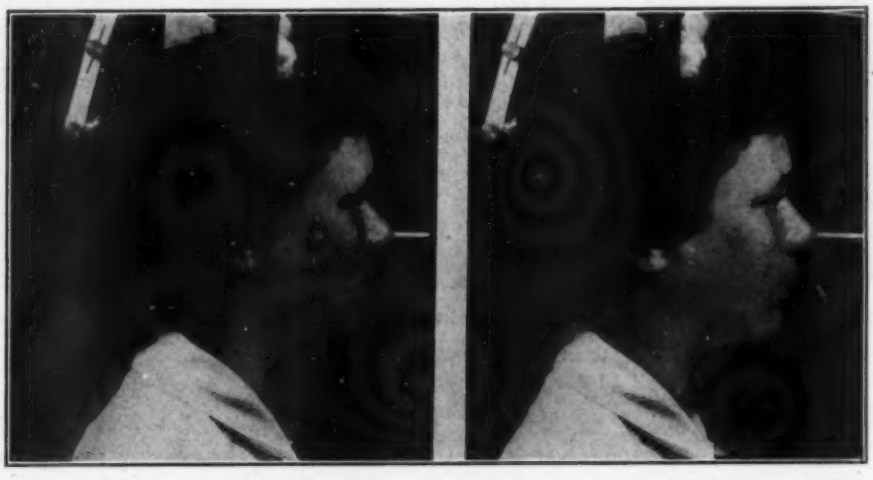

Fig. 10*B*, Case T. F.—Profile stereograms taken June 30, 1939, after treatment.

As soon as the patient is in the position previously described, the exposures may be obtained quickly. There is no need to look at ground glass focusing backs as in ordinary bellows cameras. The time of exposure is determined and standardized for all patients.

The stereograms when printed are mounted on a cardboard and viewed through the standard 7 degree stereoscope. If later pictures are obtained of the same individual and viewed together with corresponding earlier stereograms, the operator will experience the same thrill that the author did when he viewed his first such comparisons.

Fig. 11*A*. Case B. T.—A single plane profile photograph taken March 5, 1937, before treatment. Compare with Fig. 11*B*.

Fig. 11*B*, Case B. T.—Profile standardized stereogram taken June 30, 1939, after treatment. Much information is lost in the single photograph (Fig. 11*A*); the picture is not in true perspective and is viewed as only through one eye.

These stereograms may also be shown on screen by stereo projections through polaroid filters. They can then be viewed by large groups using polaroid glasses.

They are three-dimensional composites which when viewed one with the other show physical changes with respect to time (Fig. 2).

In the foregoing description and future articles emphasis will be placed upon (1) precision of records and (2) three-dimensional aspects of such records.

By the very nature of his work, the orthodontist certainly should not hesitate to think in terms of three-dimensional records, since his work is moving teeth in space.

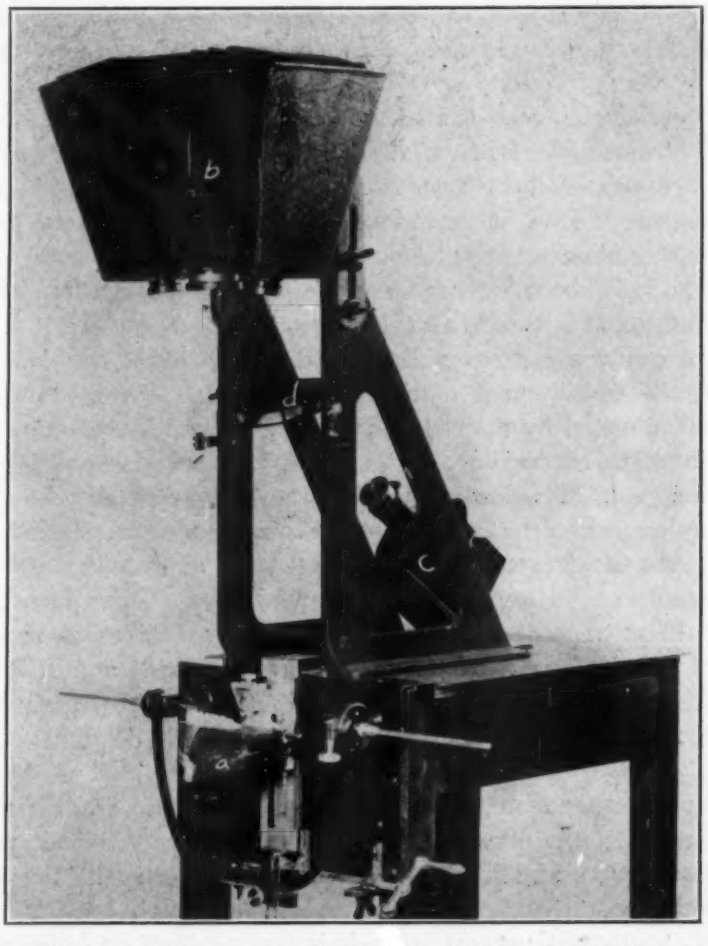

Fig. 12.—Author's apparatus for standardized stereoscopic photographs of oriented dental casts. *a*, dental cast; *b*, matched lens, fixed focus, camera, center lens serves for single plane copy work; *c*, projector for origin of light through *d*, optical flat mirror. Images projected and viewed through polaroid lenses for three-dimensional pictures.

Hundreds of years before the semicircular canals, the balancing organ by which every individual orients himself in space, were at all understood, science made wide use of three-dimensional coordinates.

(To be continued)

DENTAL OCCLUSION IN PATIENTS WITH MUSCULAR DYSTROPHY

A Preliminary Report

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AT THE Children's Hospital in Boston an attempt is made to correlate whenever possible changes in the mouth with diseases which affect the body generally.

Usually, positive correlations of this nature are established only after observations of large numbers of cases. This is true because local manifestations are not always clear, nor are they present in all cases.

But if one were to see ten or twelve cases of the same disease group and in that series observe abnormalities of similar nature in three-quarters of them, he would surely be led to believe there was some relation between the deformity and the disease condition. It is such a situation that we will discuss.

There are many references in the literature to the relation between muscle function and the development of the bones. In 1892 Wolff concluded, after studying bones affected by altered function with resulting changes in stresses, that the internal and external architecture of bone depends upon the function to which it is subjected. This view is upheld by most workers today, but it is pointed out that function is not the only factor in producing changes in the form of bones. Murray[1] considers "the form and structure of bone is a compromise between many factors." He goes on to say, "Among all these factors it is clear that one, the direct or indirect influence of mechanical stressing, is predominant in the second phase of development and in later reconstructions, but the multiplicities of factors modifying the influence of this should prevent us from expecting a precise theoretically perfect adaptation to the demands of this single determinant."

Whatever the other factors are, it is known that bone will change in form as a result of variations in pressure and tension. The rationale of treatment in many orthopedic cases and in orthodontics is based on such knowledge of the physiology of bone.

Carey[2] states that structural scoliosis is the result of an imbalance between muscle and bone growth. He says "Chronic infantile inanition and malnutrition may lead to an asymmetrical decrease in muscle weight and a persistence in the skeletal growth in length. This results in an unequal pull on the spine and the striking of an abnormal muscle-bone balance, which in time results in deformity of the spine, and function is correspondingly diminished." In paralytic conditions it is a common observation that the bones affected are smaller, weaker, and show evidence of other degenerative changes when compared with corresponding bones in the same patient.

From the Department of Stomatology, The Children's Hospital, Boston, Mass.
The Children's Clinic, Harvard Dental School, Boston, Mass.
Read before the New York Society of Orthodontists, New York City, 1939.

Baker,[3] in his experiments on rats, has shown that interference with function of teeth and mastication produces changes in the symmetry of the skull. In the last two decades several writers have emphasized the importance of maintaining equilibrium between the various muscle groups associated with normal workings of the dental apparatus and have discussed the role of muscles in developing and preserving normal facial form.

Rogers[4] on many occasions has pointed out the desirability of obtaining muscle harmony in the correction of occlusal defects and the retention of treated cases of malocclusion through the use of myofunctional therapy. Robinson,[5] LaGrow,[6] Dewey,[7] and others have also emphasized this point.

In cases of muscular dystrophy there is an opportunity to observe changes in the skeleton and the jaws which are the result of weakened muscles and muscle groups.

There are several types of muscular dystrophy which usually occur in childhood, have a strong familial tendency, appear to be transmitted by the female, and frequently, but not always, affect the male. In one type there is found early involvement and wasting of the face, giving the patient the so-called myopathic facies. The facial expression is one of indifference, and is sometimes one of stupidity, with loss of wrinkling in the forehead and nasolabial folds. Muscles about the mouth are lax and atonic. At times the upper lip projects, and is known as the tapir lip. Ability to pucker the mouth and to whistle is lost. Labial sounds are made with difficulty, and the patient may be unable to raise the corners of his mouth. This accounts for the so-called transverse smile.

The usual story presented to the physician is one of increasing weakness and awkwardness in the use of muscles, as evidenced by inability to climb stairs and to participate in the ordinary activities of playmates. The patient is later noted to walk with a peculiar gait. He holds his chest forward in order to maintain his equilibrium, and raises his feet high with each step carrying out the so-called "steppage gait." In many instances the hands are placed on the hips for added support as he walks about. Later on in the course of the disease, the child is unable to rise from the floor without aid, and if he attempts to pick up articles he regains his upright posture by climbing up his thighs with his hands until his trunk is again hyperextended.

Ely[8] states, "Clinically the disease is not difficult to recognize as the pseudohypertrophy of the muscles, particularly the muscles of the calf and thigh, and the pronounced muscular weakness are outstanding features. As a rule the first indications of the disease are detected by the parents who observe that the child is not walking as early as he should be, or if he is walking, that his gait is uncertain and awkward. These symptoms become progressively worse, so that the child becomes unable to arise from the floor and finally becomes a complete invalid." Pathologically the changes in the muscle fibers and tissue are difficult to distinguish from those occurring in poliomyelitis. The essential changes are a loss of the striations in the muscle fibers, fatty degeneration of the fibers and replacement with connective tissue. One group of workers has described changes in the nerve endings in the muscles, but this feature has not yet been substantiated. Ordinarily the disease manifests itself between the fourth and seventh years of life, or in the period of transition between infancy and child-

hood. In some instances the disease is first noted at puberty, while a few others have been reported to begin after parturition or with menopause. The latter cases suggest the possibility of an endocrine link, but they usually present no significant familial history. The etiology of the disease is not completely understood. As a matter of fact, numerous things have been associated with its occurrence. The endocrines, particularly the pineal gland, have been considered. Some believe the autonomic nervous system is affected. In this connection it has been stated that muscles are composed of two sets of fibers, each with its own nerve supply—one emanating from the anterior horn cells of the spinal cord, the other from the autonomic nervous system. Syphilis has also been mentioned. Heredity is known to play an important part, as it is often observed in members of the same family. Since nothing definite is known about the etiology of pseudohypertrophic muscular dystrophy, the methods of treatment have been largely empirical and speculative. The essential therapy today consists of diets rich in vitamins, high in protein, rest, physiotherapy, and any orthopedic measures necessary to prevent deformity and to alleviate existing deformity.

The following cases will be presented in an attempt to illustrate the effects of this disease, muscular dystrophy. It is important to remember that various muscle groups are affected at different times during the course of the disease and that in this disease we have an opportunity to watch an experiment on the modification of bone performed by nature herself.

Case 1.—This boy was first admitted to the hospital at the age of 7 years and 5 months, with a chief complaint of muscular weakness. The parents first noticed that the patient did not sit up at the usual time. He was unable to walk by himself until 2 years of age, and did not talk until the age of 2½ years. He had been under treatment for pseudohypertrophic muscular dystrophy since the age of 6, and had had difficulty with speech. Physical examination showed mild hypertrophy of the shoulder girdle, a fair muscular development except for the presence of Erb's sign, that is, the patient's shoulders approximated his ears when the examiner attempted to lift the patient by placing his hands under the patient's axillae. There was a lumbar lordosis, the shoulders were thrown back, and a wide base stance was observed. The child had a waddling gait, and it was practically impossible for him to run. The child was placed on a therapeutic plan of liver injections, high protein diet, and exercises, but has become progressively weaker despite the treatment. Fig. 1 demonstrates Erb's sign—note the proximity of the shoulders to the ears, the vacuous expression, the atrophy of the muscles of the thigh.

There was a considerable degree of distortion in the anterior portion of the upper arch, with infraclusion of the maxillary anteriors (Fig. 2). Premature loss of the mandibular right deciduous molars had allowed the opposing teeth to dip downward, but even with these teeth present on the left side, a similar shift in the level of the curve of Spee was present. It was interesting to note the tendency toward protruding maxillary incisors and infraclusion. Except for muscular dystrophy, and some enlargement of the tongue, no other contributing factors in the establishing of these deformities have been recognized.

Case 2.—There was occlusal contact between the four six-year molars only. The interdental space between the central incisors was 5 mm. in width (Fig. 3).

This boy also had a large tongue which, when his jaws are at rest, lies between the incisors, thus accentuating the deformity. There was also abnormal spacing between the maxillary left premolars. The open-bite and the spacing may well be associated with the abnormally large size of the tongue, as well as with atonic lip muscles and other groups of muscles whose tone is necessary to maintain equilibrium between external and internal muscle forces.

Fig. 1, Case 1.

Fig. 2, Case 1.

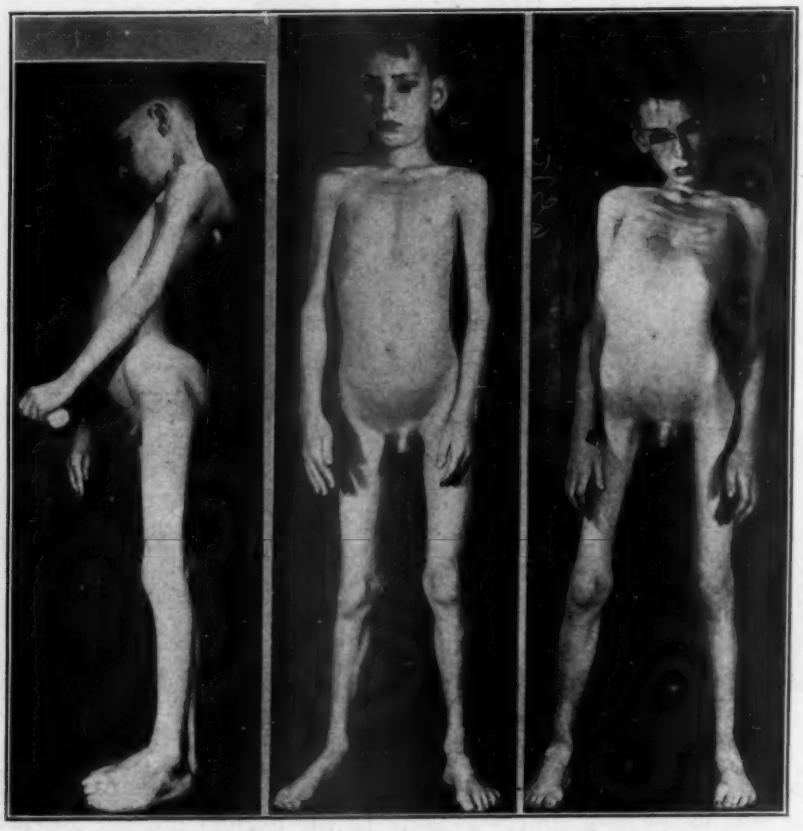
Fig. 3, Case 2.

Case 3.—First admission to the hospital was at the age of 9½ years, with the chief complaint of inability to walk in the normal manner for a period of one year. Since the onset there had been progressive weakness and awkwardness in the use of muscles. Physical examination showed a poorly developed boy whose muscles were generally wasted (Fig. 4). The face was masklike in expression. The speech was poorly articulated, as if tongue-tied. He walked with the pelvis tipped backward and marked lumbar lordosis, and threw his legs forward, raising his feet high with each step in a modified "steppage gait." There was inability to open the mouth widely, and he could not completely close his eyes.

In Fig. 5 note the wide stance, with the feet far apart in order to maintain equilibrium. There is atrophy of the muscles of the thighs and legs. The expression is sad and mask-like (age 9½ years).

Fig. 6 shows the same boy at the age of 13 years. The progression and accentuation of the skeletal deformity as the result of lost muscular strength are evident. There is extreme lumbar lordosis. The scapulae project like wings. The saddened expression is probably due to underdevelopment of the maxilla.

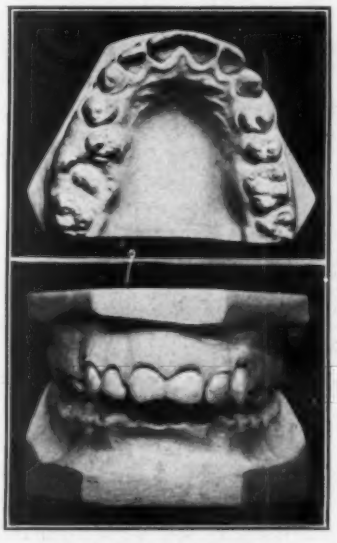
This patient shows a tendency to an open-bite deformity which becomes clear on close examination of the dentition (Fig. 7). The obvious early loss of the maxillary right deciduous molar has permitted anterior movement of the first permanent molar, resulting in palatal displacement of the second premolar. The loss of normal stimulation of alveolar bone confuses the picture, and accounts for the difference in spacing of the premolars in the lateral halves. In this case there was pseudohypertrophy of the muscles of the tongue to such an extent that insertion of the impression tray was extremely difficult.



Figs. 4, 5, and 6, Case 3.

It is believed by some workers that on occasions, loss of contact between teeth is the result of a constant outward pressure by an enlarged tongue, and such is our contention in this case, based on the spacing between the maxillary left premolars. The course of the disease has been slowly progressive throughout the period of transitional dentition, which may account for the lack of labial projection of the incisors. Fig. 8 shows the teeth in occlusion.

CASE 4.—The chief complaint was difficulty in walking. The patient showed signs of abnormal muscle development at an early age, and was unable to sit up until 1 year old. When he began walking shortly after one year, the parents noticed the peculiar waddling gait, with chest thrown forward. He first came to the hospital at the age of 2 years. Fig. 9 shows posture. There was lumbar lordosis, and the chest was thrown forward.



Figs. 7 and 8, Case 3.

Fig. 9, Case 4.

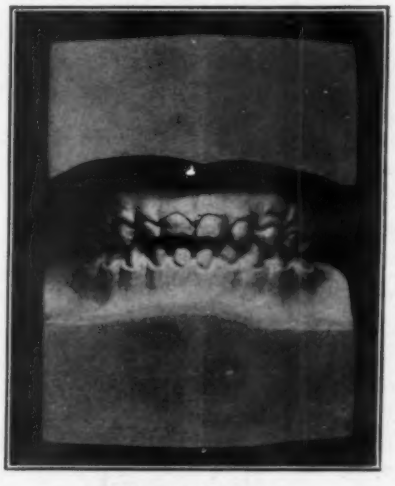
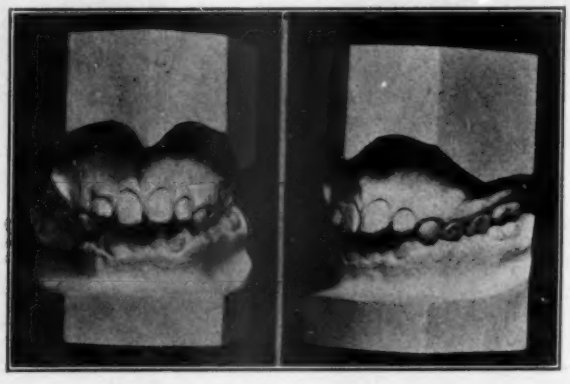


Fig. 10, Case 4.

Fig. 10 shows the dentition of the patient at the age of 4 years. The overjet is already excessive, and the beginnings of abnormal posterior relationship of the mandibular teeth to the maxillary may also be observed. Because of the absence of pernicious muscle habits, or enlargement of the tongue, we believe that the weakness of the power muscles of mastication and the loss of the molding effect of the muscles of the lips may be leading to the development of the open-bite common to these cases.

CASE 5.—Fig. 11 shows deformity in the premaxilla. There is infraclusion with protrusion of the maxillary incisors. The irregularity of the curve of Spee is shown in the lateral view (Fig. 12). This boy is now being studied at the hospital. Of interest to us is the observation that he takes two or three times as long as the other children to eat his meals. This has been constantly verified on the wards. Tested with Dr. Waugh's gnathodynamometer he was able to exert a pressure of less than twenty pounds with his molar teeth.



Figs. 11 and 12, Case 5.

DISCUSSION

Patients with a disease of primary muscle origin, all of whom show dental arch deformity or the beginnings of it, have been presented. The extent to which the muscles of the face and jaws are involved cannot be stated in a precise way at this time. It is hoped that in a future study we may have more definite information on the degree of involvement of the various muscle groups and that a report will be made on the progress and development of the arch deformities which we believe are characteristic of these patients.

CONCLUSIONS

1. In the five cases of muscular dystrophy reported, four show enlargement of the tongue.

2. In each patient there is either beginning or actual arch deformity, not accounted for by other etiological factors, which we believe are related to loss of muscular strength and to the increased size of the tongue.

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A GENERAL DISCUSSION OF DISTOCLUSION

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THE highest aim of dentistry should be the maintenance of the dental apparatus in normal health and function throughout the entire span of life or the best part of the span of life. In cooperation with this aim of dentistry, orthodontics also endeavors to maintain the dental apparatus in normal health and function throughout the span of life.

A. LeRoy Johnson writes that, "The purpose of orthodontia is to assist nature in the development of the structural elements of the jaws and so to harmonize the surrounding and supporting structural elements of the teeth that the whole mechanism will constitute an assemblage of parts best suited to the functional activities of the individual."

Andrew F. Jackson says that, "1, Structural balance, 2, functional efficiency, and 3, artistic harmony are qualities of such a universally desirable nature that as a component unit they may be quite clearly defined as the objectives of treatment and fulfill every requirement for a satisfactory dental occlusion."

"The correction of malocclusion when analyzed is the altering and making of anatomy, and anatomy exists only for function. Orthodontic treatment then should be considered only as a means to an end and that end must be normal function. Since all bones are plastic and alter their shape to comply with the demands made upon them, continued alteration and improvement can be expected after treatment has ceased, provided normal function of all associated parts exists. It becomes the duty of the orthodontist to produce a masticating unit capable of normal function and to teach, when necessary, the functional habits for these parts," writes Leland R. Johnson.

Aside from the esthetic viewpoint of normal occlusion or "straight teeth," we who are in the specialty of orthodontics feel that we know that one of the chief causes of the loss of teeth is malocclusion and malfunction, the latter condition practically always accompanying the former.

In McCoy's text *Applied Orthodontics,* he lists as predisposing causes for maloccluding teeth and attending deformations the following seven factors: 1, Unknown causes; 2, endocrine unbalance; 3, metabolic disturbances; 4, acute or chronic infections and deficiency diseases; 5, prenatal abnormalities; 6, congenital defects; 7, heredity. He also lists the following fifteen determining causes: missing teeth, supernumerary teeth, transposed teeth, malformed teeth, abnormal frenum labium, premature shedding of the deciduous teeth, prolonged retention of the deciduous teeth, tardy eruption of the permanent teeth, loss of permanent teeth, improper dental restorations, intrauterine pressure and other pressure problems as related to sleeping habits and posture, abnormal muscular habits, and malfunctioning muscles.

Some writers have stated that about 50 per cent of the causes of malocclusion are inherited and about 50 per cent of the causes are acquired.

Read before the American Board of Orthodontics, 1939.

In using the term distoclusion, I am referring to the type of malocclusion in which the mandibular teeth have assumed a position distal or posterior to normal. Some writers have referred to this classification as posterior occlusion, mandibular retroversion, and Simons' classification as mandibular retraction usually associated with maxillary protraction.

In Dewey-Anderson's *Practical Orthodontia,* according to Angle's classification of distoclusion, we find this definition: Distoclusion or Class II is the distal relation of the mandibular arch to the maxillary dental arch as shown by the position of the mesiobuccal cusp of the maxillary first molar fitting into the interproximal space between the mandibular first molar and the second premolar. Under Angle's classification it will be recalled that in Class I or Neutroclusion, the mesiobuccal cusp of the maxillary first molar occludes in the buccal groove of the mandibular first molar. Class II, or distoclusion, therefore, represents the posterior relation of the mandibular dental arch to the maxillary dental arch by the width of half the first molar or by the full width of a premolar or to a greater degree. Angle divided distoclusion or Class II into Division 1 and Division 2, both of which are bilateral, i.e., affecting both sides of the dental arch. The one-sided arrangement he termed unilateral and called it a subdivision of Class II, Division 1 or Division 2. Class II or distoclusion Division 1 is a distal relation of the mandibular arch to the maxillary arch and is characterized by protruding maxillary anterior teeth and Class II or distoclusion Division 2 is a distal relation of the mandibular arch to the maxillary arch and is characterized by retruding maxillary anterior teeth.

Dr. James David McCoy has given a more detailed and descriptive classification of distoclusion in a recent paper in which he points out that distoclusion may involve not only the teeth and their alveolar supports, but that additional mandibular structures may be involved. He has also introduced some new terminology. The following is quoted from McCoy's paper: "Among the anomalies which have placed orthodontists under the greatest responsibility are those characterized by malrelationships between the maxillary and the mandibular structures. Under this broad classification are to be found those cases in which, inclusive with other anomalies, the mandibular teeth are posterior to the normal relationship. Such anomalies may be limited to the denture alone; that is, the teeth and their immediate alveolar supports only may be involved, or additional mandibular structures may be included in the deformity. In the event of this additional involvement, the body or the rami, or both, may contribute in differing degrees. This fact becomes the more evident as we examine Fig. 2 (Fig. 1 in this paper) in which a group of such cases is shown. In such instances marked similarities in the dentures and in the relationship of the teeth prevail, but in spite of this fact other conditions outside the immediate dental area are so definitely evident that the dissimilarity of the two types immediately becomes established.

"In times past, all cases having either of these characteristics were known as 'Class II cases,' 'distoclusions,' 'posterior occlusions,' etc., and until orthodontists supplemented their powers of observation with dependable denture and facial records for diagnostic purposes and to record treatment accomplishments, their wide variability was not fully recognized. In view of the fact

that other important elements besides tooth closure must be considered in describing anomalies, I feel that the terms, 'retro' (meaning in a backward direction) and 'version' (implying position) more adequately describe the most outstanding characteristics of these cases. Hence, we may have a 'dental retroversion' in which the teeth contribute chiefly to the condition, or a ('dental plus') 'mandibular retroversion,' when in addition, the mandibular structures are likewise involved. In describing other dental anomalies, the term 'anteversion' is also suggested to designate structures which have deviated in a forward direction; 'intraversion' to describe narrow dental arches or individual teeth too near the median plane; 'extraversion' to designate deviations in the opposite direction; and the terms 'supra' and 'infra' version to signify structures above or below their normal positions. Such terms are suggested because of their simplicity and application to all structures included in the anomalies we must consider."

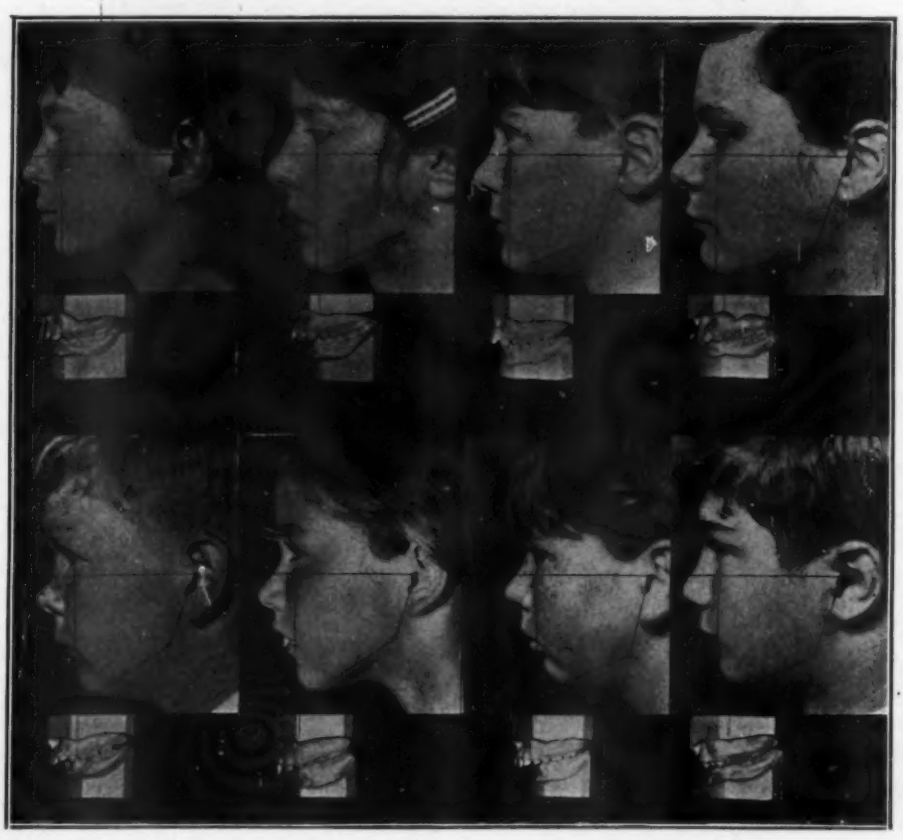


Fig. 1. (From McCoy, James David: Am. J. Orthodontics and Oral Surg. 23: 1, 1937.)

Fig. 1 shows photographs made by McCoy and referred to in McCoy's article, "Diagnosis and Treatment of Dental and Mandibular Retroversions."

The photographs shown in Fig. 2 represent a typical case of distoclusion or Class II, Division 1. This type is usually characterized by protruding maxillary anterior teeth, may or may not have a narrow maxillary arch, may or may not have a high vault, a mandible that may be deficient, usually a deep overbite,

abnormal muscular pressure, usually a short upper lip and a full rolled lower lip with wide vermilion border. Patients of this type are usually mouth breathers, but may not be.

In using Angle's classification of distoclusion, I am fully aware of the fact that the first molars, maxillary and mandibular, are not constant or fixed in their positions. We know that the first molars are subject to change, and this fact should of course be taken into consideration in making a diagnosis. So it seems to me that for the convenience of classification, diagnosis, and study Angle's classification, along with some of the newer terminology, is a good system to use, i.e., using the first molar as a starting point or as Angle calls it, the key to occlusion. The terminology of Lischer and others is being used more and more in orthodontic literature.

Fig. 2.

Regarding the constancy of the first molars, Thompson says, "We now know that the maxillary first molars are not stable as landmarks; yet we do know that the maxillary first molars and canines are far more reliable as points from which to judge mesiodistal variations than any other teeth."

It might be correctly stated that orthodontic diagnosis is a search for, or determination of, the difference between the existing denture of a patient in question and the condition to be established that would be as near as possible to what we would consider a norm or normal.

It is estimated that distoclusion occurs in about one-third of our cases of malocclusion. The following is quoted from a survey made by Sved: "Out of several thousand cases examined the figures show that in more than two-thirds of the malocclusions of the teeth the anteroposterior relationship of the jaws is normal. Almost the entire remaining one-third belongs to Class II (or distoclusion) and only a very small percentage of Class III cases occur. This indicates that primarily malocclusions are due to underdevelopment and that overdevelopment either is accidental or is brought about by some unknown influence."

An understanding of growth and development, it seems to me, is one of the very important phases of our orthodontic work. The more that we understand and know about growth and development and fit our orthodontic interference in with the natural process of growth, the easier our work will be, our results will be more pleasing and our corrections more permanent. It has been stated that growth cannot be induced and that we cannot change natural growth in

treatment, but it is a fact that with orthodontic appliances, growth in the jaws can be directed, and we can take advantage of growth in our procedure.

In 1936 Howard of Atlanta, Ga., presented a paper on growth. He did some fine and very extensive work along this line in which he showed a large number of x-ray pictures of the bones of the hands and a correlation between the development of the bones of the hand and skeletal development of the entire body. Howard showed a growth chart in a scale of years showing stages of growth periods and stages of retardation of growth or inhibitory stages. This chart is presented as Fig. 3.

In regard to growth the following is quoted from Todd: "It is not only constitutional debility which brings about a failure of growth. Growth is but one expression of progressive maturity, but it is the most obvious expression because it can be measured in dimensions.

"The orthodontist has really a great and constructive interest in the anatomic form, in the growth pattern, and in the physiologic state of the nasal passages and it is impossible for him to attain the good results which he seeks so long as there is a center of disturbance in the neighboring area of the face reducing the efficacy of his procedures."

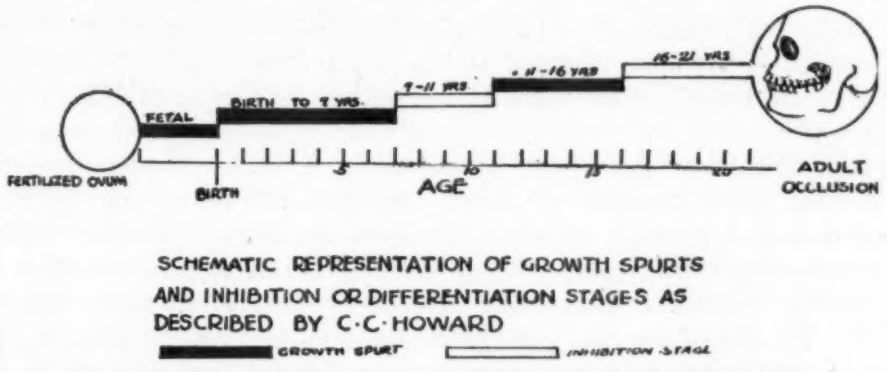


Fig. 3. (From Howard, C. C.: INT. J. ORTHODONTIA 22: 893, 1936.)

In another article regarding growth of the face, Todd says, "Faces differ and most of us are content to assume that the differences are largely due to the hereditary tendencies implicit in the genes. But as the face, like the rest of the body, is a plastic thing, and since the adult contours are the end result of a growth pattern which in the course of its progress may be expedited, interrupted, retarded, warped, or inhibited by misadventures of health and by vagaries in the interplay of those organically organized influences by which the pattern is promoted, it is evident that environment, external, and more particularly internal, must contribute in no small manner to the final result."

The following is quoted from Brash regarding changes taking place in the face: "To some it may appear probable that if we were in possession of the necessary data we would discover that all the variations with which we are concerned have a genetic basis. However that may be, it is clearly reasonable on general principles to consider environment—including in the most general sense of the word all individual factors external and internal—as the complement of

the genetic constitution. We may therefore combine a consideration of how environment enables genetic constitution to express itself with an inquiry whether environment can so modify a 'normal' genetic constitution as to produce structural alterations which have to be designated as 'abnormal'."

Scott says in "An Experimental Study in Growth of Mandible," "The most compact accepted definition of growth and development is that growth is an increase in bulk while development is an adaptation of that bulk to function. It appears, therefore, that the former refers to spatial enlargement, while the latter deals with adjustment of growth increments to function through morphologic differentiation."

In a recent article written by Rogers, he says, "The principles that underlie normal development and normal changes of the tooth position must not be ignored or omitted from the plans of construction, or the orthodontist will in some instances interfere very seriously with the normal processes of development."

So as stated above, an understanding of the processes of growth and development is most important. But in many instances the natural processes of growth are interfered with by some general or systemic cause as disease or malnutrition or maybe by some local cause from injury, trauma, or pathology.

McCoy very wisely advises the collaboration between the pediatrician and orthodontist in his text, *Applied Orthodontics,* from which the following is quoted: "No longer do we think of mechanical appliances as being the open sesame for meeting our problems, for in spite of noticeable advances in this field such agencies are inadequate unless used in a manner to augment inherent possibilities within the oral structure. At all times we are dependent upon responsiveness of growing, changing structures and bring to the fore the importance of having them in an optimum state of health so that growth changes induced by orthodontic means may proceed to the greatest advantage of the patient. In view of the fact that the majority of such are children, the pediatrician should in numerous instances be the collaborator of the orthodontist in the solving of related problems."

McCoy continues, "This is the more appreciated when we realize that dental and oral anomalies represent conditions wherein aberrations of growth and function are manifest and that the extent to which they have developed represents the degree to which normal processes have been interfered with or inhibited at some period in the life of the child. Such unfavorable influences should be eliminated prior to or concurrent with orthodontic treatment. Many orthodontic children should receive a thorough medical examination so that any unfavorable constitutional factors could be uncovered and steps initiated toward their correction."

In a paper by Noyes entitled "Clinical Orthodontic Evidence of Systemic Disease," he writes, "It is probable that a serious arrest in development in any part of the skeleton is never completely compensated subsequently." And he (Noyes) draws the following conclusions at the end of his paper:

"1. Accurate diagnosis and skillful mechanics do not completely solve the orthodontist's problems.

"2. The face is one of the most sensitive areas of the human body to systemic disturbance.

"3. Because of the delicate balance required between growth, development, and function, subclinical disturbances may be most evident through their effect on facial development.

"4. Facial deformities and malocclusion may often be the means of discovering general systemic disturbances, but it should be remembered that these local conditions seldom name the exact cause. They indicate a deviation from normal progress; its etiology must be sought elsewhere.

"5. A knowledge of the systemic background of the child and appraisement of his general as well as facial growth and developmental progress will be found to be of assistance in diagnosis, treatment, and progress."

An interesting viewpoint of some of our orthodontic problems in malocclusion from the standpoint of nutrition and diet was written by Dr. Nina Simmonds of California. In her paper entitled "Nutrition—One Factor in Orthodontics," she writes that, "For nearly three years at the University of California College of Dentistry, dietary studies have been made on all children accepted for orthodontic treatment in addition to a physical examination and laboratory tests.

"Of the first eighty children, I have listed from the nutrition setup standpoint three or 3.75 per cent as Very Poor Risks; nineteen or 23.75 per cent as Poor Risks; forty-one or 51.25 per cent as Fair Risks, and seventeen or 21.25 per cent as Good Risks. Let me hasten to say that these children were excellent teaching cases. While working under guidance the students would probably meet nearly every problem that they would ever meet in practice except the nutritional one.

"Sixty-six of the eighty children could not be considered good orthodontic risks from a nutrition standpoint. The remaining seventeen could be considered good risks because of their favorable nutrition setup which includes good food habits, good health habits, and, in many instances, a good health record. However, I fully recognize that they could be orthodontic failures due to one or more factors mentioned by McCoy. But I am speaking of the orthodontic risk from the nutrition setup standpoint. If one of these seventeen children were an orthodontic failure, factors other than nutrition could be said to be playing the dominant role; whereas if any number of the sixty-three children mentioned as very poor, poor, or fair risks were failures, one could raise the question as to whether an unsatisfactory nutrition setup (in addition to possible rapid growth) had been in part responsible for the unsatisfactory outcome.

"However, as I studied these three papers (the writer is referring to three papers regarding causes of orthodontic failures, written by three prominent orthodontists), which you will all probably admit comprise the best thought extant upon the causes of failures in orthodontic practice, I was struck with the absence of any mention of the possibility of unsatisfactory nutrition being a factor in part at least responsible for failures. The three men discussed failures in treatment as if all the responsibility for success (or failure) should rest with the orthodontist. Granted, the orthodontist has his share of responsibility.

But on the other hand, what factors are involved in the growth of new bone? Is not the growth of new bone a factor in bringing an orthodontic case to a successful close?"

In another article by Dr. Simmonds, she says, "But if all patients have had in the past and have during and after treatment an optimum diet and a healthy body, which enables them to utilize the various factors in their diet, the orthodontist would have one less variable with which to contend. Malnutrition with or without rapid growth cannot be other than a poor combination for an orthodontist. Is not Todd correct when he says that, 'It is the demineralized bone which impedes the work of the orthodontist'? This type of bone may be and often is the result of a faulty diet, but of course factors other than diet may bring about a demineralized bone."

The following two quotations are also from Simmonds:

"All children are not equal orthodontic risks from the health and nutrition standpoints."

"All other things being equal, a person in optimum health should be a better orthodontic risk than a person in poor health."

McCoy writes, "In natural sequence came the realization that dental and oral anomalies represent conditions in which aberrations of growth and function are manifest, with their character depending largely upon the age period, degree of severity, and the length of time such pathologic influences have been in effect. In this manner the scope of the problem increased materially and offered a challenge which could not be ignored if our specialty was to meet its full obligations."

After we have considered the biologic, hereditary, nutrition factors and the growth processes involved in a case of malocclusion and have taken into consideration the age of the patient as to the most favorable time of treatment, and made our diagnosis as distoclusion, it then becomes our task to treat the case and design appliances that will best produce the desired result.

Bach has very nicely expressed an orthodontic viewpoint with regard to treatment, when he writes, "The use of orthodontic appliances is the one physical means we can employ in treating malocclusion and is no doubt the greatest factor at our command. Many statements have been made regarding the mechanistic turn of mind of the orthodontist and of the dental profession in general. Regardless of the justice these charges imply, it is doubtful whether you and I shall see the day when the mechanical side of orthodontia will be thrown in the discard. No other means now within control can fill this vacancy. I am well aware of the advocates of muscle training, exercise, and development through stimulation. They accomplish wonderful results, especially in many young patients, before resorting to orthodontic treatment to induce desired changes.

"The more we delve into the science of orthodontia and follow its advancement, the more we must be convinced that heredity, nutrition, and growth factors play a more important part in our work than do the things we use most—namely, appliances. However, we cannot yet treat our patients along these lines to the exclusion of mechanical stimulation."

I am showing two types of appliances in the treatment of two cases of distoclusion. The original models of the first case are shown in Figs. 4, 5, 6, and 7. It will be noted that the mandibular left temporary first molar had been lost when the original models were made as shown in lower model, Fig. 7. The mandibular anterior teeth in this case had drifted lingually to some extent on account of the early loss of this molar. This accounts for the fact that the mandibular lingual appliance as shown in Fig. 10 (right), is not made symmetrically, being shorter on the left side.

Fig. 4.

Fig. 5.

Fig. 6.

Figs. 4-6.

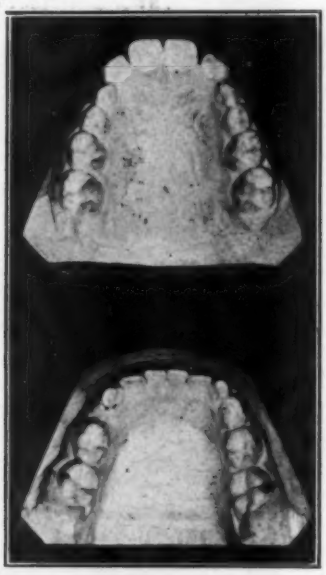


Fig. 7.

In this case there were used on the superior maxillary teeth a plain round labial appliance with round tube attachments and a plain lingual wire with half-round tube attachments. Intermaxillary hooks were soldered on the labial wire for intermaxillary elastics. These appliances are shown in Figs. 8, 9, and 10.

On the mandibular arch, Figs. 8, 9, and 10, a plain round labial appliance with round tube attachments and a plain round lingual appliance with half-round tube attachments were used. Intermaxillary hooks were soldered on the round tubes for intermaxillary elastics as shown in Fig. 10. The reason for soldering the intermaxillary hooks in this manner on the round tubes on the mandibular arch is that I have found it very difficult in some cases to hook the

intermaxillary elastics over the posterior end of the labial arch wire for patients at this age. At this particular age the second permanent molar has not erupted and usually the posterior end of the labial arch wire that extends through the round tube is very close to and may be slightly imbedded in the gum tissue. Then too there may be a time when for some reason we want to leave off the mandibular labial wire and still have the patient wear intermaxillary elastics. I have found this type of intermaxillary hook on the mandibular appliance to be very satisfactory. At first observation it would seem that a hook soldered in this position would irritate the tissues of the cheek and also catch food, but with very few exceptions, I have not found this to be the case. The patient in this case was very fine and cooperative in every way, and the work progressed nicely and easily moved into neutroclusion. An appliance of this kind is very effective where the patient cooperates fully and wears intermaxillary elastics as directed. And I am sure most of us have had patients who say that they just forget to wear the elastics and the case does not progress satisfactorily.

Fig. 8.

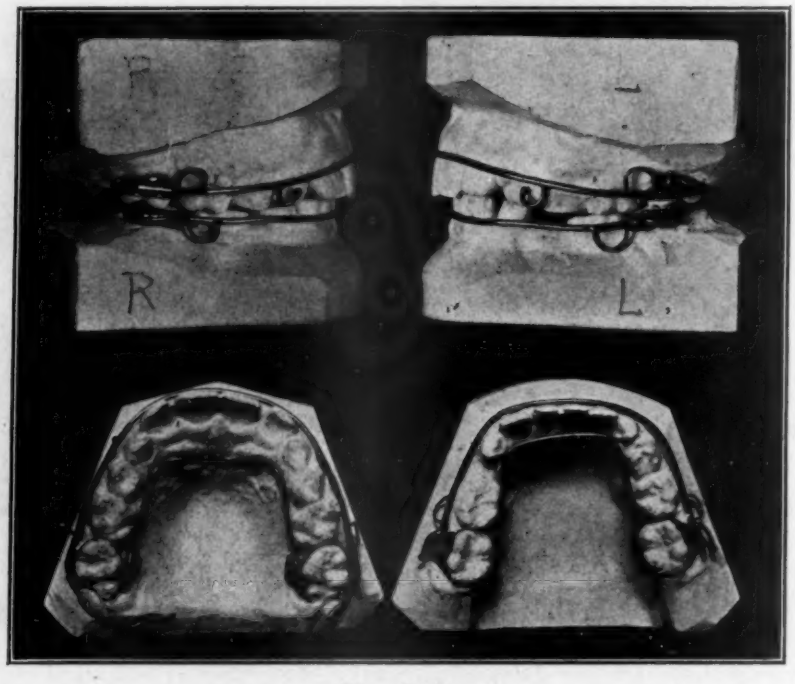


Fig. 9. Fig. 10.

Figs. 8-10.

Figs. 11, 12, and 13 show the original models of another case of distoclusion. This case was treated with an Oliver type guide plane. Figs. 14, 15, and 16 show the appliances in position on the models. Intermaxillary elastics are also to be worn with this type appliance. One of the distinct advantages of this type appliance in distoclusion cases is that the guide plane guides or causes the patient to bite forward into neutroclusion or at such a position at which the guide plane is set.

As stated above, intermaxillary elastics are to be worn in connection with a guide plane appliance, but if the patient is one of the noncooperative type and

forgets to wear the elastics, the case will nevertheless progress and continue to improve and establish a neutroclusion relationship.

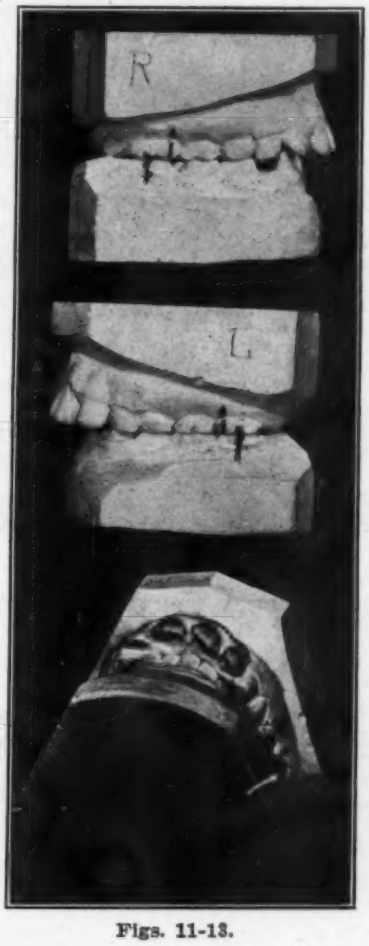
In keeping with the idea of growth and development previously discussed in this paper, the plan of treatment as outlined by these two types of appliances is designed to take advantage of the processes of growth and development by directing growth from a position of distoclusion to a position of neutroclusion.

In regard to the bite plane and its development, Dr. Harry E. Kelsey wrote a very splendid paper in 1938, in which he says that it has been his experience that many orthodontic appliances have been frequently resurrected or reinvented and that this has probably occurred many times in reference to the bite plane. He found that in 1880 Kingsley described a form of bite plane that he (Kingsley) used and was probably the originator of the method of using the steep bite plane to correct the anteroposterior malrelation of the maxillary and mandibular teeth in patients presenting a Class II or distoclusion condition.

Fig. 11.

Fig. 12.

Fig. 13.



Figs. 11-13.

Kelsey's article reviews the history of the bite plane and gives the results through a period of years of a number of men who have brought out new designs in bite planes or who have changed the designs to some extent.

The form of bite plane that I would like to call attention to in this paper and one that is shown in Fig. 16, in the treatment of the last case, is one that

was designed by Dr. Oren A. Oliver. Oliver has given the name of guide plane to his particular design of appliance, in that the appliance is so designed to guide the bite into neutroclusion. It differs from other types of bite planes in that the mandibular incisors do not bite directly onto the guide plane itself, but in front of it and the guide plane occludes with the lower lingual appliance. In the picture of the appliance shown in Fig. 17, which is not the appliance used in the treatment of the case mentioned above, you will note the design of this type of appliance and the position at which the supplementary or guide wire is placed on the lingual body wire. The position and height of the supplementary wire, however, is determined by the bite in each individual case.

Fig. 14.

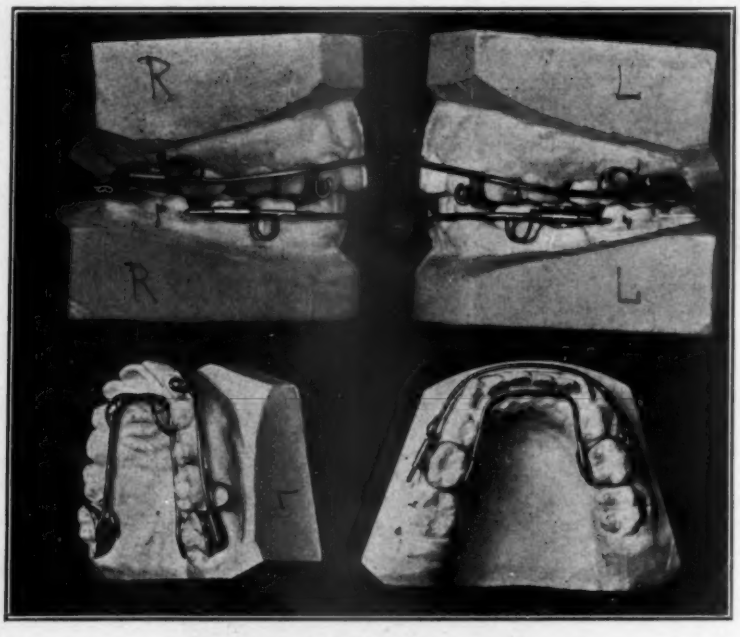


Fig. 15. Fig. 16.

Figs. 14-16.

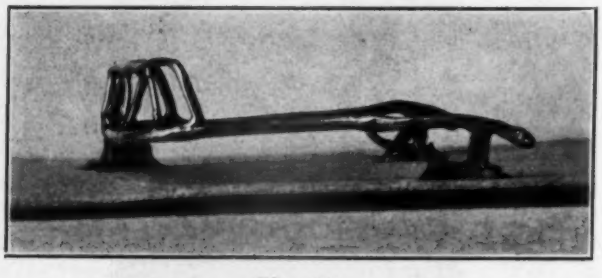


Fig. 17.

In 1938 Dr. Stephen C. Hopkins of Washington, D. C., wrote a paper entitled "Preliminary Guide Plane Report" in which he listed the advantages of the Oliver guide plane. I am quoting the following nine advantages from Dr. Hopkins' paper:

"1. It changes the bite to normal immediately, in most cases, thus cutting down considerably the length of treatment.

"2. In placing the arches in normal relation, they are placed so that normal muscular action is possible from the beginning of treatment. This is most important as in most cases abnormal muscular action is present.

"3. It opens the bite for the vertical growth in the molar and premolar region so often required and so slowly obtained by other methods.

"4. It opens the bite for a more favorable movement of maxillary individual teeth which may be locked in position of malocclusion prior to the placement of the plane.

"5. It fixes the bite at the perfect normal relation as far as we may determine, rather than a hit or miss relation obtainable when using elastics alone.

"6. It changes the profile immediately, creates confidence, initiates greater cooperation as patient can readily see what is to be the end result. Parents are most favorably impressed.

"7. The immediate placement of the guide plane provides for normal breathing instead of mouth breathing, due to the establishment of normal position of the jaws and lips.

"8. It tends to break up tongue habits, lip biting, thumbsucking, and other deleterious habits.

"9. There is less chance of relapse and lack of cooperation due to its forced position. Patient may wear the elastics or leave them off, and the bite remains the same."

When a case of distoclusion is moved from distoclusion to neutroclusion there are of necessity certain changes which take place in the temporomandibular articulation in the superior maxilla, in the mandible, in the alveolar process, in the position of the teeth themselves, and in the muscles of mastication and adjacent structures. For example, when the guide plane is used in the treatment of a distoclusion case, the patient must bite forward and change his bite to neutroclusion in the process of mastication. The immediate effect in a change of this kind would of necessity be in the temporomandibular articulation and the condyle is carried forward out of its normal position in the glenoid fossa to a position on the eminentia articularis, to about the position that is normally assumed by the condyle in the act of protruding the mandible. But if the guide plane and intermaxillary elastics are continually worn and the case remains in neutroclusion the head of the condyle cannot continue to remain out of the glenoid fossa on the eminentia articularis. Mershon, Waugh, and others have stated that muscle tissue is a dominate factor over bone. Hellman, Todd, and others have shown that the superior maxilla and mandible grow downward and forward. As a patient grows older the angle of the mandible may also change to some extent. Therefore, it seems to me that we could be correct in stating that when we change a case of distoclusion to neutroclusion we can be safe in assuming that the changes take place in the position of the teeth themselves and the alveolar process, in the condyle and neck of the condyle, in the rami, possibly a lengthening of the body of the mandible, in the angle of the mandible to some extent and that there would be a certain amount of adjustment in the muscles of mastication.

As stated above, muscle is a dominate factor over bone. So, it seems that the continual action of the muscles of mastication and the muscles and ligaments

attached to the condyle and the neck of the condyle would gradually change the shape of the neck of the condyle, so that the condyle would, through the process of growth, be gradually changed back into its former or correct position in the glenoid fossa. And if these changes have taken place and the case is changed to neutroclusion, the factors present which have undergone a change would gradually adjust themselves to the new position of the mandible and remain established.

Before closing this paper, I think the subject of retention should be mentioned. The forces of retention are natural and mechanical.

There is a varied difference of opinion regarding retention. One school of thought advises slow treatment, frequent and maybe long rest periods, and no retention other than the appliances themselves that were used in the treatment of the case.

Another school of thought advises more rapid treatment and some form of retention in the nature of a removable retaining appliance, which may be removed and inserted by the patient and worn all the time or part time.

In this regard Mershon states, "You can move teeth to where you think they belong—nature will move them to where they will best adapt themselves to the rest of the organism."

In Anderson's revision of Dewey's *Practical Orthodontia,* fifth edition, we find, "Proper recognition of the requirements of physiologic tooth movement, so there will be no interference to normal cell functioning, is a sound background upon which the correction and retention of malocclusion may be undertaken."

In his *Text Book of Orthodontia,* Strang states: "At the present time, though the orthodontist still is confronted with the problem of mechanical support after active treatment is over, yet he views it as a phase or a mere transitory stage of the whole period of treatment, its purpose being to afford an opportunity for those tissues that are to act as the natural and permanent maintainers of tooth and dental arch position to reconstruct their architectural forms in order to comply with the demands of the functional forces that play upon the denture."

McCoy writes in the fourth edition of his *Applied Orthodontia,* "Teeth and dental arches are not fixed units after tooth movement, and are subject to modifications and changes incident to growth and development."

In the seventh edition of Angle's *Malocclusion of the Teeth,* we find, "After malposed teeth have been moved into the desired position they must be mechanically supported until all the tissues involved in their support and maintenance in their new positions shall meet the new requirements."

Dewey stated in his *Practical Orthodontia,* fourth edition, "It has been said that the problem of modern orthodontia is one of retention. With the modern regulating appliances it becomes quite easy to regulate teeth, but to keep them in their new position has been difficult."

As stated above, there is a difference of opinion regarding the subject of retention. So it would seem that it becomes the duty of each individual orthodontist to check up on and watch each case after he considers the case corrected and see if the case is remaining in good occlusion, or if there is a tendency to

relapse. Some orthodontists think that there are very few cases that relapse after the period of growth is over. It would seem that certain type patients would be more subject to relapse than others. And it would seem that relapses would be most frequent in and some form of retention would be more necessary in patients who had some form of tongue, lip, cheek, or finger habit and in whom normal breathing was not established and in whom there was abnormal muscle pressure or pull. In other words, if there were certain forces or factors present that helped cause the malocclusion in the first place and those factors were not removed with the correction of the malocclusion, there would be a strong tendency for the case to relapse. Alfred Rogers who advocates myofunctional therapy stresses this point. To repeat again, the forces of retention are natural and mechanical.

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707 MEDICAL ARTS BUILDING

STUDIES CONCERNING THE ORAL CAVITY AND SALIVA

I Palate (2) Palatal Measurements*

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A REVIEW of the literature on palatal measurements reveals an apparent lack of agreement in the results reported. Careful analysis of the results shows that the lack of agreement is principally due to the various workers making the same measurement from different points of the dental arch. The confusion resulting from an attempt to compare the measurements of former palatal studies has prompted the writers to prepare Dental Arch Mensuration Charts. The use of these charts will make it possible to convert the results of former studies to a common basis for the sake of comparison and study. These charts along with the results of former studies will be presented in another report.

The study reported herein is concerned with the width, length, and height measurements of the palates of children. The measurements were taken directly from the mouth and were made from the following points: (1) Width—between the lingual surfaces of the maxillary first molars at the gingival margins, (2) Length—from the lingual surfaces of the central incisors, at the gingival margin, to the base of the posterior nasal spine, (3) Height—from a plane coinciding with that of the gingival margins of the maxillary first molar teeth to the highest point of the palatal vault in the midline.

The instrument was a modification of one used by Talbot.[1] A description of this instrument has previously been reported.[2] All measurements were made to the closest millimeter.

No effort was made to select the children comprising the group studied. The group constituted a fairly representative cross section of school children. The children ranged in age from 6 to 17 years.

Tabulated in Table I are the mean, standard deviation, and standard error of the mean of the various palatal measurements. The cases have been arranged in yearly age groups according to sex. In general, the increase in all the measurements is fairly uniform with age. However, due to the variability, as shown by the standard deviation, there is some overlapping of the different age groups. This overlapping of values is not apparent when the cases are regrouped as in Table II. In the measurements taken, the increase is greatest in length, next in width, and least in height. This increase in palatal measurements, in an age group 6 to 17 years, is approximately 4.5, 5.0, 10.0 mm. for height, width, and length respectively. The data show no significant differences between males and females. The difference between sex may be real in adulthood as reported by Talbot.[3]

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TABLE I

MEAN, STANDARD DEVIATION, AND STANDARD ERROR OF THE MEAN OF WIDTH, LENGTH, AND HEIGHT MEASUREMENTS OF PALATE (MALE, FEMALE AND BOTH OF YEARLY AGE GROUPS)[1]

AGE IN YEARS	SEX	CASES	WIDTH IN MM.			LENGTH IN MM.			HEIGHT IN MM.		
			MEAN	S. D.	S. E.	MEAN	S. D.	S. E.	MEAN	S. D.	S. E.
	M	17	31.0	2.53	.61	28.9	4.53	1.09	12.6	3.44	.83
6	F	2	27.0	3.00	2.12	30.0	2.00	1.41	11.5	.50	.35
	B	19	30.6	2.62	.60	29.0	4.46	1.02	12.5	3.22	.73
	M	24	31.5	3.74	.76	33.0	7.01	.67	13.7	.42	.09
7	F	5	30.0	1.67	.74	33.0	5.51	2.46	12.0	2.76	1.23
	B	29	31.2	3.46	.64	33.0	6.77	1.25	13.3	2.16	.40
	M	30	34.1	3.13	.57	34.6	3.67	.67	13.3	1.96	.35
8	F	12	31.0	4.50	1.29	33.0	6.81	1.97	14.0	3.01	.87
	B	42	33.2	3.95	.61	34.1	5.13	.79	13.5	2.33	.36
	M	46	32.6	2.71	.40	35.3	3.64	.53	13.1	2.61	.38
9	F	13	32.5	3.63	1.00	36.2	4.27	1.19	13.6	1.72	.48
	B	59	32.6	2.69	.35	35.5	3.96	.51	13.3	1.26	.16
	M	45	34.2	4.61	.68	36.0	5.37	.80	14.4	2.27	.34
10	F	16	34.6	2.69	.67	37.2	4.55	1.14	13.6	3.07	.77
	B	61	34.3	4.24	.54	36.3	5.30	.68	14.2	2.47	.31
	M	48	34.2	4.30	.62	35.6	3.49	.50	13.6	2.74	.39
11	F	33	34.2	3.05	.53	35.9	4.45	.77	14.9	2.53	.44
	B	81	34.2	3.78	.42	35.7	4.20	.47	14.1	2.88	.32
	M	64	35.5	5.58	.69	37.7	4.73	.59	13.8	2.40	.30
12	F	45	34.7	4.44	.66	36.2	1.66	.24	15.1	2.34	.34
	B	109	35.1	5.61	.53	37.1	4.12	.39	14.3	2.99	.28
	M	55	35.1	4.83	.65	38.2	5.41	.72	14.2	2.62	.35
13	F	19	33.5	3.87	.88	39.2	3.95	.90	15.0	2.40	.53
	B	74	34.7	4.59	.53	38.5	4.76	.55	14.4	2.00	.23
	M	70	34.9	6.51	.79	38.4	3.89	.46	15.2	3.33	.39
14	F	14	35.0	5.21	1.39	39.7	8.69	2.32	15.2	1.99	.53
	B	84	34.9	6.41	.69	38.6	5.17	.56	15.2	3.15	.34
	M	92	36.3	4.66	.48	40.4	4.36	.45	15.9	3.39	.35
15	F	4	37.7	2.99	1.49	42.0	3.04	1.52	15.5	1.12	.56
	B	96	36.4	4.27	.43	40.5	4.00	.41	15.9	3.12	.31
	M	56	35.4	4.65	.62	39.1	4.80	.64	16.2	3.13	.42
16	F	2	37.5	8.50	6.02	34.5	3.50	2.48	14.0	2.00	1.41
	B	58	35.5	4.64	.61	38.9	5.17	.67	16.1	3.24	.42

[1]Standard deviation $= \sqrt{\frac{\text{Sum of the squares of the observations}}{\text{Number of cases}} - (\text{Mean of Observation})^2}$.

Standard error of the mean $= \frac{\text{Standard deviation}}{\sqrt{\text{No. of cases}}} = \text{S.E.}$

TABLE II

MEAN, STANDARD DEVIATION, AND STANDARD ERROR OF THE MEAN OF WIDTH, LENGTH, AND HEIGHT MEASUREMENTS OF PALATE (MALE, FEMALE AND BOTH OF VARIOUS AGE GROUPS)

AGE YEARS	SEX	NO. CASES	WIDTH IN MM.			LENGTH IN MM.			HEIGHT IN MM.		
			MEAN	S. D.	S. E.	MEAN	S. D.	S. E.	MEAN	S. D.	S. E.
6-8	M	71	32.9	3.37	0.40	32.7	6.86	0.82	13.3	2.41	0.29
	F	19	30.2	3.71	0.80	32.7	6.34	1.32	13.2	3.18	0.66
	B	90	32.3	2.83	0.29	32.7	5.83	0.61	13.3	2.05	0.22
9-11	M	139	33.7	3.87	0.33	35.6	3.74	0.32	13.7	2.22	0.19
	F	62	33.9	3.61	0.45	36.3	4.58	0.57	14.3	2.65	0.34
	B	201	33.8	3.46	0.24	35.8	4.24	0.29	13.9	2.24	0.16
12-14	M	189	35.3	4.79	0.35	38.1	5.00	0.39	14.4	3.31	0.24
	F	78	34.7	2.00	0.23	37.6	5.74	0.65	15.1	2.75	0.31
	B	267	35.1	4.35	0.27	38.0	4.24	0.26	14.6	3.16	0.19
15-17	M	148	36.3	3.61	0.29	39.9	3.74	0.30	16.0	3.31	0.27
	F	6	38.0	5.22	1.86	38.5	5.57	1.98	14.5	2.28	0.80
	B	154	36.4	3.61	0.28	39.9	3.00	0.23	15.9	3.46	0.27

Table III shows the frequency distribution for the various measurements. The table shows the variability or scatter of the observations around their respective means to be considerable.

In Table IV are given the results of former palatal studies of children in which the width was measured from the lingual surfaces of the maxillary first molars. As pointed out before, the agreement in results is fairly good when comparison is made between measurements taken from similar points of the dental arch. While the results of this study when compared with former studies differ slightly, the magnitude of the difference is no greater than that found between age groups for any particular measurement in this study. The same is true for former palatal height measurements tabulated in Table V.

SUMMARY

1. Reasons for existing confusion when measurements of former palatal studies are compared are discussed. When comparison is made in measurements taken from similar points, agreement is relatively good.

2. Palatal measurement of width, length, and height was made on 712 school children ranging in age from 6 to 17 years. No effort was made to select the children.

3. The increase in the means for the eleven-year spread in ages was approximately 4.5, 5.0, 10.0 mm. for height, width, and length respectively. The increase from year to year while not constant, due to considerable variability, was fairly uniform.

4. The data show no significant difference between males and females in the age groups studied.

TABLE III

FREQUENCY DISTRIBUTION OF PALATAL MEASUREMENTS

AGE YEAR	SEX	NO. CASES	WIDTH (MM.) 24-27	28-31	32-35	36-39	40-43	44-47	48-51
6-8	M	71	4	22	34	11	0	0	0
	F	19	3	9	6	0	1	0	0
	B	90	7	31	40	11	1	0	0
9-11	M	139	3	34	68	29	5	0	0
	F	62	0	13	37	8	4	0	0
	B	201	3	47	105	37	9	0	0
12-14	M	189	9	24	60	71	19	4	2
	F	78	2	19	30	20	4	2	1
	B	267	11	43	90	91	23	6	3
15-16	M	148	1	14	53	57	22	3	3
	F	6	0	1	1	3	2	1	0
	B	154	1	15	54	60	24	4	3

AGE YEARS	SEX	NO. CASES	LENGTH (MM.) 20-23	24-27	28-31	32-35	36-39	40-43	44-47	48-51
6-8	M	71	2	8	15	27	14	4	1	0
	F	19	1	1	5	6	3	3	0	0
	B	90	3	9	20	33	17	7	1	0
9-11	M	139	0	6	21	46	45	15	5	1
	F	62	0	2	10	16	16	16	1	1
	B	201	0	8	31	62	61	31	6	2
12-14	M	189	0	3	14	50	43	48	19	12
	F	78	0	0	7	23	22	18	5	3
	B	267	0	3	21	73	65	66	24	15
15-16	M	148	0	1	7	22	32	61	25	5
	F	6	0	0	1	1	3	1	2	0
	B	154	0	1	8	3	35	62	27	5

AGE YEARS	SEX	NO. CASES	HEIGHT (MM.) 6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25
6-8	M	71	1	3	12	22	23	8	2	0	0	0
	F	19	0	3	2	5	4	3	2	0	0	0
	B	90	1	6	14	27	27	11	4	0	0	0
9-11	M	139	2	5	20	39	43	21	7	2	0	0
	F	62	0	1	7	16	19	15	3	1	0	0
	B	201	2	6	27	55	62	36	10	3	0	0
12-14	M	189	2	2	23	47	54	40	16	5	0	0
	F	78	0	0	6	12	24	28	7	1	0	0
	B	267	2	2	29	59	78	68	23	6	0	0
15-16	M	148	0	0	6	18	54	38	28	6	1	2
	F	6	0	0	1	1	3	3	0	0	0	0
	B	154	0	0	7	19	57	41	28	6	1	2

TABLE

PALATAL HEIGHT MEASUREMENTS TAKEN FROM FORMER PALATAL STUDIES IN WHICH THE HEIGHT OF THE VAULT IN THE MIDLINE. THE NUMBER OF

WORKER	SEX	6 YR.		7 YR.		8 YR.		9 YR.		10 YR.	
		CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.
Channing and Wissler[4]	M	16	12.5	26	12.8	76	11.9	50	12.3	63	13.0
	F	39	11.3	35	11.9	29	12.4	54	13.0	48	12.0
Case[5]	M	1	12.0								
	F					1	9.3	1	10.0		
Alkan[7]	M	4	15.4	7	15.0	5	15.0	3	14.0	6	16.0
	F	1	19.0			3	13.0	4	14.0	5	15.0
Hellman[8]	B										
Brawley and Sedwick	M	17	12.6	24	13.7	30	13.3	46	13.1	45	14.4
	F	2	11.5	5	12.0	12	14.0	13	13.6	16	13.6
Total	M	38	12.8	57	13.5	111	12.4	99	12.7	114	13.7
	F	42	11.5	40	11.9	45	12.8	72	13.1	69	12.6
	B	80	12.1	97	12.9	156	12.5	171	12.9	183	13.3

TABLE

PALATAL WIDTH MEASUREMENTS TAKEN FROM FORMER PALATAL STUDIES IN WHICH THE WIDTH NUMBER OF CASES IS TABULATED

WORKER	SEX	6 YR.		7 YR.		8 YR.		9 YR.		10 YR.	
		CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.
Channing and Wissler[4]	M	16	32.0	25	32.8	29	32.9	53	33.5	62	33.3
	F	39	32.3	36	32.4	31	32.5	54	33.0	47	32.5
Case[5]	M	1	31.3								
	F					1	34.1				
Wallace[6]	M			1	33.2	1	34.0	1	33.8		
Brawley and Sedwick	M	17	31.0	24	31.5	30	34.1	46	32.6	45	34.2
	F	2	27.0	5	30.0	12	31.0	13	32.5	16	34.6
Total	M	34	31.5	50	32.2	60	33.5	100	33.1	107	33.7
	F	41	32.0	41	32.1	44	32.1	68	32.8	63	33.0
	B	75	31.8	91	32.2	104	33.0	168	33.0	170	33.4

IV

WAS MEASURED FROM A PLANE ON A LEVEL WITH THE GINGIVAL MARGINS TO THE HIGHEST POINT CASES IS TABULATED ACCORDING TO SEX AND AGE.

11 YR.		12 YR.		13 YR.		14 YR.		15 YR.		16 YR.	
CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.
61	13.1	63	13.4	33	12.5	54	13.1	37	14.2	42	13.9
49	12.5	48	12.6	48	13.4	38	13.6	33	14.8	37	14.1
		1	7.0			1	12.0				
3	16.0	3	17.2			4	14.5	1	17.5		
5	15.0	5	14.7	2	18.3	6	18.0				
11	11.4										
48	13.6	64	13.8	55	14.2	70	15.2	92	15.9	56	16.2
33	14.9	48	15.1	19	15.0	14	15.2	4	15.5	2	14.0
112	13.5	131	13.6	88	13.6	129	14.2	130	15.4	98	15.2
87	13.4	101	13.8	69	14.3	58	14.4	37	14.8	39	14.1
210	13.4	232	13.7	157	13.9	187	14.3	167	15.3	137	14.9

V

WAS MEASURED FROM THE MIDDLE OF THE LINGUAL SURFACE OF MAXILLARY FIRST MOLARS. THE ACCORDING TO SEX AND AGE.

11 YR.		12 YR.		13 YR.		14 YR.		15 YR.		16 YR.	
CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.	CASES	MM.
66	34.0	60	33.2	32	33.2	53	33.3	37	34.3	43	34.7
51	32.9	47	33.2	48	33.2	38	33.7	33	32.8	37	32.6
		1	34.5			1	38.0				
1	33.5	1	34.0			1	33.9				
48	34.2	64	35.5	55	35.1	70	34.9	92	36.3	56	35.4
33	34.2	45	34.7	19	33.5	14	35.0	4	37.7	2	37.5
115	34.1	126	34.4	87	34.4	125	34.2	129	35.7	99	35.2
84	33.4	92	33.9	67	33.2	52	34.1	37	33.3	39	32.8
199	33.8	218	34.2	154	33.9	177	34.2	166	35.2	138	34.5

The authors wish to express their sincere appreciation to the following individuals and their staffs who made this study possible by their wholehearted cooperation: Dr. H. J. Burkhart; Sister Benigna; Dr. S. W. Clausen; M. E. Coon; C. Cory; Sister Edith; Wm. Hawley; J. S. Hollander; Dr. C. H. Holzwarth; Sister Mildred; V. J. Morgan; E. O'Keefe; J. S. Owens; Dr. E. J. Pammenter; Dr. J. M. Spinning; O. E. Young; to the Rochester Dental Dispensary for supplying and developing x-ray film used in the work; to the Ritter Dental Manufacturing Company for the loan and installation of an x-ray machine and other dental equipment; and to the Beech-Nut Packing Company for the grant under which this study was conducted.

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THE OBJECTIVITY OF A METHOD OF ORIENTING SUBJECTS FOR TEMPOROMANDIBULAR ROENTGENOGRAMS

T. D. Speidel, D.D.S., M.S., and L. Goldberg, D.D.S., M.S., Iowa City, Iowa

A ROENTGENOGRAPHIC technique for the temporomandibular area, in which positional relationships are to be determined, should have sufficient reliability and objectivity to allow valid comparisons of successive roentgenograms. Recently Speidel and Maxon[1] tested the reliability of a method of positioning subjects for temporomandibular roentgenograms and showed that an operator can reposition subjects with vertical and horizontal deviations from the original positions of less than 2 mm. in 75 per cent of the instances. Since, in the technique investigated, the roentgen tube position was constant and the cassette was located mechanically, the accuracy of repositioning the subjects was considered indicative of the reliability of the entire technique.

However, no experimental evidence has been found in the literature as to how nearly two operators, working independently, can obtain identical results with a temporomandibular roentgenographic procedure. Such information is essential whenever the roentgenograms made by one person are to be compared with the roentgenograms made by any other person. Therefore, it seemed advisable to measure the objectivity of a method of positioning the subjects for temporomandibular roentgenograms. This portion of the technique was selected for investigation since mechanical positioning of the tube and cassette is a much less difficult problem than that of stabilizing anatomic structures.

EXPERIMENTAL

Two operators, working entirely independently but using the same technique,[2] each obtained right and left temporomandibular roentgenograms of a group of thirty-four subjects. The position of the mandibular condyle, relative to standard reference lines common to all films, was measured on each roentgenogram. Comparison of corresponding measurements on the first and second operators' roentgenograms determined the extent to which the subjects' positions were duplicated by the two operators.

The persons roentgenographed were thirty-four young adults, aged 19 to 27 years, with relatively correct dental relationships. All roentgenograms were obtained within a period of two months. The subjects were instructed to maintain centric occlusion of the teeth for the duration of each roentgenographic procedure.

The reference lines[1] on the roentgenograms were produced by a vertical and horizontal .010 inch steel wire held in the roentgenographic field by a portion of the cassette holder.

The degree of accuracy with which the subjects' positions were duplicated by the operators was determined by comparing corresponding measurements

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from the mandibular condyle to the constant reference lines on the two series of roentgenograms. It was felt that a comparison of condyle positions would be the most severe test of the accuracy of positioning the subjects, since the condyle position is dependent on both head orientation and mandibular relationship to the head. A vertical measurement was taken from the most superior point of convexity of the condylar process to the nearest point on the horizontal reference line. A horizontal measurement was made from the most posterior point of curvature of the condylar process to the closest point on the vertical reference line. All measurements were made with a millimeter gauge equipped with a vernier, so that readings could be made in tenths of millimeters. The measurements were made by a person other than the ones who took the roentgenograms, after both series of films were completed, and, directly on the roentgenograms viewed under constant transillumination.

TABLE I

MEASUREMENTS FROM THE CONDYLE TO THE REFERENCE LINES ON THE FIRST AND SECOND OPERATORS' ROENTGENOGRAMS OF THE TEMPOROMANDIBULAR AREAS OF 34 SUBJECTS

SUBJ. NO.	LEFT TEMPOROMANDIBULAR AREA						RIGHT TEMPOROMANDIBULAR AREA					
	VERTICAL MEAS.			HORIZONTAL MEAS.			VERTICAL MEAS.			HORIZONTAL MEAS.		
	FIRST	SECOND	DIF.	FIRST	SECOND	DIF.	FIRST	SECOND	DIF.	FIRST	SECOND	DIF.
1	35.8	35.3	0.5	17.8	18.3	0.5	33.2	32.5	0.7	10.8	15.5	4.7
2	31.6	30.6	1.0	20.2	20.4	0.2	30.4	31.3	0.9	10.6	13.6	3.0
3	32.4	34.3	1.9	19.8	22.7	2.9	31.4	33.8	2.4	16.3	12.8	3.5
4	31.5	29.1	2.4	19.7	20.0	0.3	34.8	33.3	1.5	15.2	13.3	1.9
5	32.0	33.7	1.7	19.4	18.6	0.8	34.2	37.7	3.5	11.0	15.6	4.6
6	27.1	27.1	0	19.6	16.7	2.9	32.2	28.6	3.6	8.1	16.1	8.0
7	28.3	31.3	3.0	19.3	16.3	3.0	29.1	33.4	4.3	10.4	10.5	0.1
8	40.3	40.2	0.1	22.2	20.3	1.9	38.2	37.8	0.4	10.2	14.1	3.9
9	25.8	28.0	2.2	16.5	18.5	2.0	27.3	28.2	0.9	13.7	13.7	0
10	34.5	33.7	0.8	20.5	21.2	0.7	34.3	35.1	0.8	8.0	13.6	5.6
11	33.1	40.7	7.6	20.3	19.2	1.1	33.4	34.1	0.7	12.2	12.4	0.2
12	34.4	35.6	1.2	17.7	19.2	1.5	29.9	30.3	0.4	9.6	6.7	2.9
13	34.3	38.8	4.5	24.8	21.7	3.1	31.7	31.5	0.2	12.3	10.8	1.5
14	30.4	32.6	2.2	16.2	16.7	0.5	33.3	30.3	3.0	12.6	9.6	3.0
15	33.3	37.1	3.8	23.1	21.4	1.7	33.6	35.0	1.4	14.2	15.6	1.4
16	37.8	39.6	1.8	22.3	20.4	1.9	38.5	37.2	1.3	8.4	8.1	0.3
17	34.4	33.2	1.2	18.5	20.3	1.8	30.7	33.7	3.0	16.2	15.4	0.8
18	37.2	31.2	6.0	21.9	19.6	2.3	36.4	31.5	4.9	8.8	10.1	1.3
19	42.0	42.0	0	20.7	26.6	5.9	30.7	32.7	2.0	14.2	13.3	0.9
20	29.5	30.2	0.7	23.2	20.1	3.1	31.0	31.7	0.7	14.7	12.6	2.1
21	31.3	31.5	0.2	20.8	22.3	1.5	32.1	33.7	1.6	16.3	13.4	2.9
22	44.0	39.6	4.4	20.1	25.5	5.4	38.3	33.6	4.7	11.6	12.3	0.7
23	30.0	33.8	3.8	19.6	19.6	0	29.3	28.5	0.8	10.8	11.1	0.3
24	32.4	38.3	5.9	21.0	17.4	3.6	35.3	36.6	1.3	9.6	11.4	1.8
25	40.0	40.5	0.5	22.2	26.7	4.5	33.9	36.7	2.8	14.0	12.8	1.2
26	38.4	37.0	1.4	20.2	22.3	2.1	38.2	35.0	3.2	4.6	6.1	1.5
27	38.2	38.5	0.3	17.8	17.0	0.8	33.5	35.3	1.8	2.1	4.5	2.4
28	23.4	24.0	0.6	22.2	23.4	1.2	25.0	24.6	0.4	13.2	14.0	0.8
29	28.8	29.7	0.9	15.0	10.4	4.6	29.4	30.2	0.8	9.5	13.2	3.7
30	31.7	33.6	1.9	13.2	16.4	3.2	30.2	31.8	1.6	17.8	16.1	1.7
31	27.0	27.2	0.2	21.2	21.2	0	23.8	24.2	0.4	9.1	11.0	1.9
32	30.0	28.2	1.8	21.7	23.4	1.7	26.0	29.8	3.8	12.5	18.2	5.7
33	33.6	32.3	1.3	17.9	22.2	4.3	37.3	38.2	0.9	9.6	12.3	2.7
34	31.1	35.0	3.9	19.1	21.5	2.4	31.4	36.8	5.4	7.4	6.0	1.4

In Table I the corresponding measurements on the first and second operators' roentgenograms of each subject are presented in adjacent columns, followed by the differences between each pair of similar measurements. The actual

dimensions are of little significance in this study. The differences between the corresponding dimensions indicate the accuracy of repositioning.

The differences, irrespective of sign and grouped in one millimeter intervals, were arranged in a frequency distribution table, Table II. In order to

TABLE II

FREQUENCY DISTRIBUTION OF THE DIFFERENCES BETWEEN THE CORRESPONDING MEASUREMENTS LOCATING THE CONDYLE ON THE FIRST AND SECOND TEMPOROMANDIBULAR ROENTGENOGRAMS

INTERVAL GROUPING IN MM.	DIFFERENCES BETWEEN VERTICAL MEASUREMENTS		DIFFERENCES BETWEEN HORIZONTAL MEASUREMENTS	
	NUMBER	PER CENT	NUMBER	PER CENT
0 to 0.9	26		18	
1.0 to 1.9	17		19	
2.0 to 2.9	6		11	
3.0 to 3.9	10		10	
4.0 to 4.9	5		5	
5.0 to 5.9	2		4	
6.0 to 6.9	1			
7.0 to 7.9	1			
8.0 to 8.9			1	
Median	1.4 mm.		1.9 mm.	
75th Percentile	3.0 mm.		3.0 mm.	
90th Percentile	4.4 mm.		4.6 mm.	

further indicate the dispersion of these differences, the median, the seventy-fifth percentile, and the ninetieth percentile were determined.

The median vertical difference was 1.4 mm., or, in 50 per cent of the instances the second operator placed the mandibular condyle with less than 1.4 mm. vertical deviation from the condyle positions used by the first operator. Seventy-five per cent of all vertical differences in position were less than 3.0 mm.; 90 per cent were less than 4.4 mm.

The median horizontal difference between the condyle positions used by the first and second operators was 1.9 mm.; 75 per cent of all horizontal differences were less than 3.0 mm.; 90 per cent were less than 4.6 mm.

DISCUSSION

These data indicate that the technique used allows another operator to position subjects for second temporomandibular roentgenograms with vertical and horizontal deviations from the positions used by the first operator of less than 3.0 mm. in 75 per cent of the instances.

It is felt that the extent to which accurate repositioning of the subjects can be accomplished is indicative of the objectivity of the roentgenographic technique investigated since the tube location is constant and film is positioned mechanically.

Whether or not variations in position of the magnitude found in this experiment are great enough to invalidate comparisons of successive temporomandibular roentgenograms of the same individual cannot be determined from the data presented here.

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THE EXTRACTION OF MAXILLARY SECOND MOLARS TO REDUCE GROWTH STIMULATION

Case Report

Walter Coolidge Chapin, D.D.S., F.A.C.D., New York, N. Y.

A DISCUSSION which took place three years ago before this society prompts the selection of the following case report today. It is also a case which I submitted to the American Board of Orthodontia.

It is, briefly, a case of the Angle Class II, Division 1 type with three molars congenitally missing in the mandible and all six molars present or forming in the maxilla. Besides the usual orthodontic procedures, the case was treated by the extraction of the maxillary second molars.

Fig. 1 shows the original models of a girl, 13 years of age, and the condition of the teeth when treatment was begun. The lack of room for the eruption of the maxillary canines and their position anteriorly can be seen, also the relationship of the molars. One must keep in mind the missing molars, two on the mandibular left side and one on the mandibular right side.

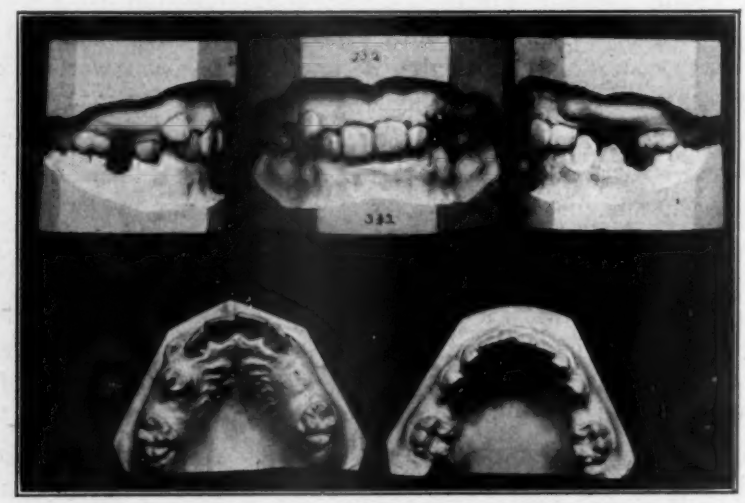


Fig. 1.

The case was treated by using simple lingual arch appliances, in conjunction with a maxillary labial appliance, which afforded attachment for the use of intermaxillary rubber bands.

The teeth (Fig. 2) responded to the usual treatment of this type of case fairly well up to a certain point, but I could not seem to get the anteroposterior relationship of the arches fully corrected, especially on the left side. The

Presented before the New York Society of Orthodontists, March, 1939, New York City.

mandible seemed to lack the power of growth. This was due, it seemed to me, to the absence of the follicles of the mandibular second and third molars on the left side and also the absence of the follicle of the mandibular third molar on the right side.

In contrast to the reduced stimulation for growth in the mandible, it must be remembered that the normal stimulation and rate of growth continued in the maxilla are due to the formation of all the maxillary molars. This caused a condition of disharmony in the growth rate of the maxilla and mandible.

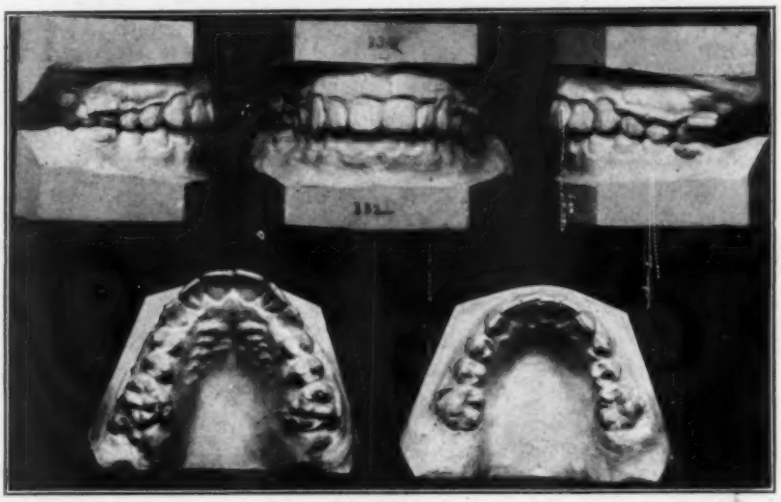


Fig. 2.

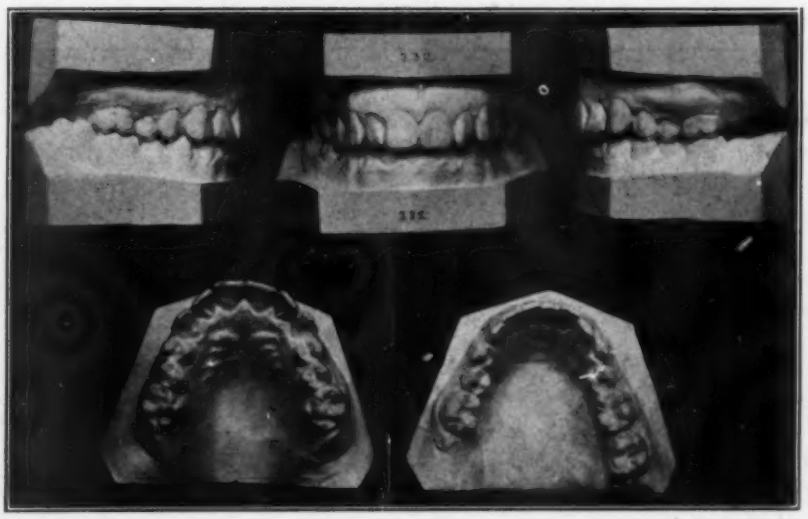


Fig. 3.

In regard to the future of this case I had an abiding fear that as soon as the treatment was ended and I had removed the appliances, the case would relapse and again revert to a Class II type molar relationship, with the maxillary canines prominent and the anterior ones crowded. Having this in mind, I decided to extract the maxillary second molars; in so doing I hoped possibly

to reduce the growth stimuli in the maxilla, so as to make the conditions for growth in both jaws more equal.

This was done and the treatment continued for a few months to improve the relationship of the teeth. The patient then wore the appliances and rubber bands at night only for a period of six months, and then all appliances were removed.

A. *B.*

Fig. 4.

Fig. 4*C*.

Since the end of treatment I have seen the patient several times as a matter of interest in following up the result. The next two slides show the models and photographs of the patient taken more than five years after treatment.

Instead of a relapse in the arch form and relationship occurring as I had feared before the extraction of the maxillary second molars, I believe the occlusion and condition of her teeth have improved with time (Fig. 3). One will notice, however, that the molar relationship is still not perfect on the left side. This I believe is due to the presence of only one mandibular molar. Recent photographs of the patient showing the appearance of the teeth in the

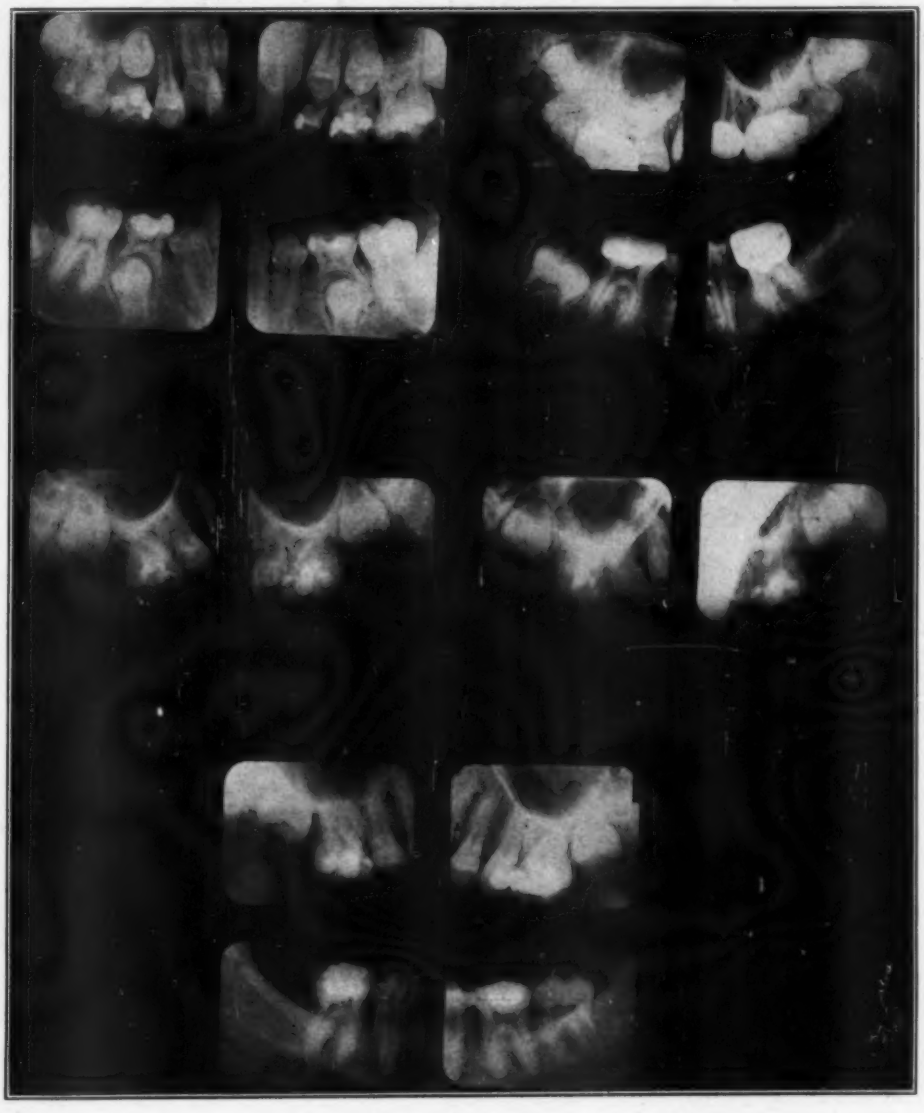


Fig. 5.

mouth are shown in Fig. 4. In Fig. 5 one can see some of the molar area x-rays showing the case before and after the extraction of the maxillary second molars and the progress of the maxillary third molars in assuming the normal position of the second molars.

This case is reported in order to add to the evidence and to justify the extraction of teeth as a rational orthodontic procedure in unusual conditions.

In this particular instance the extraction of the maxillary second molars seemed wise for the following reasons:

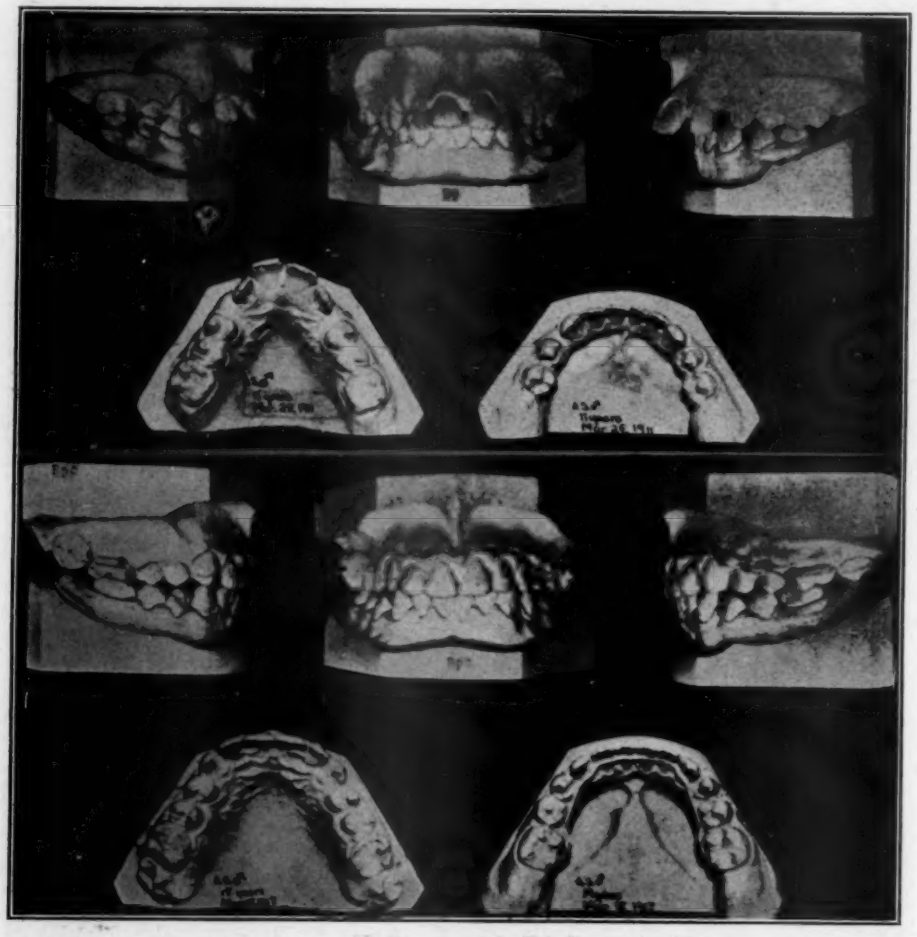
1. To reduce the stimulation for growth in the maxilla in order to harmonize this factor with the mandible.

2. To make the amount of tooth material in the maxilla more nearly that of the mandible.

3. To promote the establishment of better relationship and interdigitation of the arches and teeth.

Fig. 6.

Fig. 7.



Figs. 6 and 7.

4. To prevent the overeruption of the maxillary molars and the associated complications due to lack of natural mandibular molar antagonists and the impossibility of providing artificial antagonists.

5. To take advantage of the favorable eruption of the maxillary third molars in their assuming the position of the second molars without orthodontic aid.

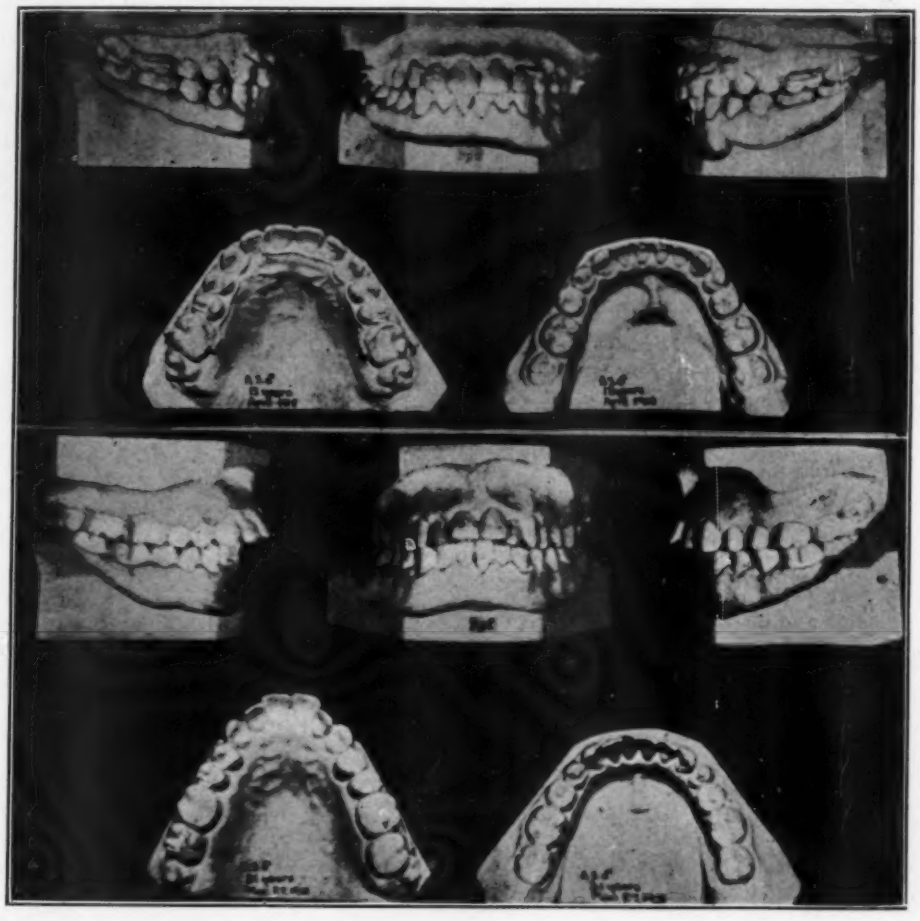
As a second part of this presentation, I would like to direct attention to a case, which is in many respects similar, presented before this society as a part of a symposium on failures in orthodontics. In this other case there is

likewise a lack of tooth material in the mandible, but, instead of it being the result of congenitally missing molars, it is because the first permanent molars were extracted at an early age. However, I think from this point on the mandibles are, to a degree, similar in that both cases lacked mandibular teeth and their influence upon growth. I will show illustrations of this other case which appeared in the *International Journal of Orthodontia,* in the April, 1936, issue with quotations from the author, Dr. Milo Hellman.

Fig. 6, "Casts of dentition of a boy eleven years of age showing Class II, Division 1 malocclusion. Note absence of mandibular first molars and close spaces of maxillary canines."

Fig. 8.

Fig. 9.



Figs. 8 and 9.

Fig. 7, "Condition after five years of treatment and retention. Maxillary second permanent molars erupted, but no occlusal antagonist present in mandible."

Fig. 8, "One year later, retention still in place, mandibular third molar erupted and occluding with maxillary second molars."

Fig. 9, "Thirteen years later, showing complete relapse to Class II, Division 1 as in first slide of this case. Maxillary third molars erupted with no occlusal antagonists in mandible."

During the discussion which followed, Dr. Hellman was asked if he were to treat the case over again would he not extract the maxillary second molars? He replied, "No." To the question of whether he would extract the maxillary third molars, Dr. Hellman replied, also, "No." Dr. Kelsey in discussing this case said, "If Dr. Hellman had foreseen what inevitably must happen and what did happen and had taken out either the maxillary second or third molars, I believe he would have had a permanent success or what we call a permanent success."

Apparently Dr. Hellman is consistent for he advised against the extraction of any teeth in this case which I have had under treatment and have presented today. To quote from the same article by Dr. Hellman, "The justification and significance of orthodontics as it is to be handed down to posterity will depend not upon the game of 'follow the leader' but upon what every one of us will do to re-enforce the foundation which is being laid down now. To this end no other material is of greater value than the priceless collections of orthodontic cases comprising successes as well as failures."

2 East 54th Street

A CASE REPORT ON THE HEREDITARY FACTOR IN THREE CASES OF MESIOCLUSION

BROOKS BELL, D.D.S., DALLAS, TEXAS

IN MANY cases of mesioclusion coming into our office we are unable to definitely determine the etiological factor or factors responsible for these malformations. In the cases presented here I would like to bring to your attention not only that these malformations apparently are inherited, but that, in spite of this handicap, it is possible to bring about marked improvement in masticatory function and facial symmetry.

I would also call to your attention the fact that, when these malformations are evidenced in one of the parents, restoration of masticatory function and facial symmetry may be accomplished only up to a certain limit—the limit of inherited tendency. Beyond this indiscernible limit our efforts, through mechanical stimulation, to bring about a closer approach to any normal established by the operator are futile.

Fig. 1.—Case 1. The mother shows slight tendency toward mandibular protrusion. The child has inherited this tendency, which has been corrected by restoring normal occlusion.

History.—In only one of these three cases was there family history of mandibular malformation beyond the parents, Case 3 in which the maternal grandmother had a protrusive mandible.

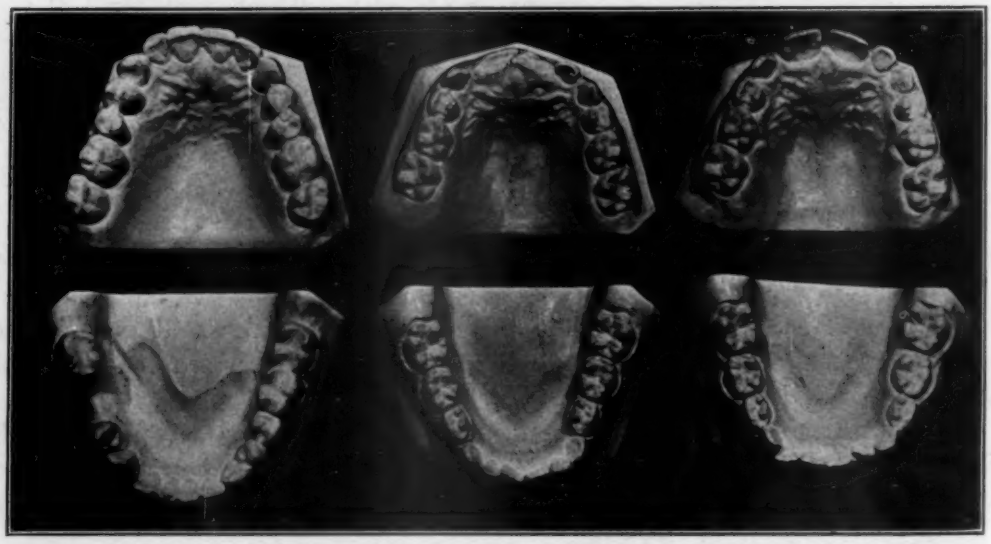
In all three cases thorough general physical examinations were made which included tests for metabolism, blood cholesterols, and blood calciums, but no evidence of endocrine disturbance was present. In Cases 2 and 3, hand x-rays

Read before the American Association of Orthodontists, April 17 to 20, 1939, Kansas City, Mo.

were made, following Dr. Clint Howard's findings that acromegaloid conditions are frequently diagnosable through their hand x-rays showing accelerated ossification centers. However, the centers in these cases were diagnosed as normal. Third molars were not considered sufficiently formed to be causative factors at these ages.

Mother Patient

Fig. 2.—Occluded models of Case 1.



Mother Patient

Fig. 3.—Occlusal views of Case 1.

Fig. 4.—Case 2. The mother shows a marked mandibular protrusion. This inherited tendency has been completely corrected by restoring normal occlusion.

Mother Patient

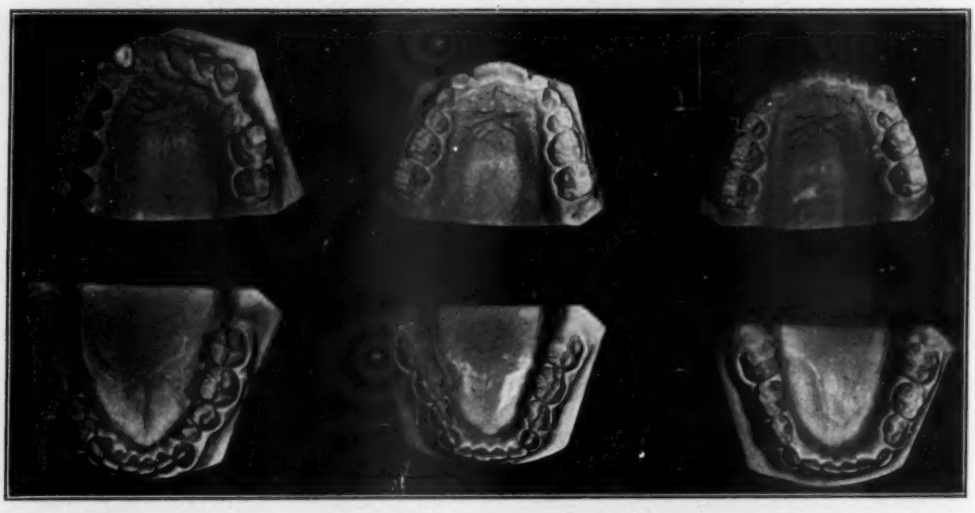
Fig. 5.—Occluded models of Case 2.

Etiology.—These malformations were attributed to an inherited tendency toward mandibular protrusion.

Diagnosis.—Mesioclusion or Class III, with constriction and lack of anterior development of the maxillary arch.

Case 3 may be considered an instance of macrognathia of the mandible.

Treatment.—The usual treatment therapy followed in the correction of mesioclusion was employed. A labial arch with intermaxillary hooks in the canine region was placed in the mandible, stabilized through attachment to first



Mother Patient

Fig. 6.—Occlusal views of Case 2.

Fig. 7*A*.—Case 3. The maternal grandmother and mother show marked mandibular protrusion. In the child the protrusion has been somewhat reduced but not completely; she is still under treatment.

deciduous molars by means of bands with K hooks and with further stabilization furnished through a lingual arch with Ellis posts. A lingual arch with Ellis posts was placed in the maxilla, having recurved springs for lateral development of the deciduous molars and canines and for anterior development of the central and lateral incisors. Added stabilization was furnished by a labial arch attached to the banded first deciduous molars by K hooks.

Intermaxillary elastics were worn day and night and changed nightly. Case 3, in addition to intermaxillary elastics, wore a skull-cap chin strap day and night. Appointments were given at three- and four-week intervals.

Fig. 7*B*.—Case 3. Anterior photographs.

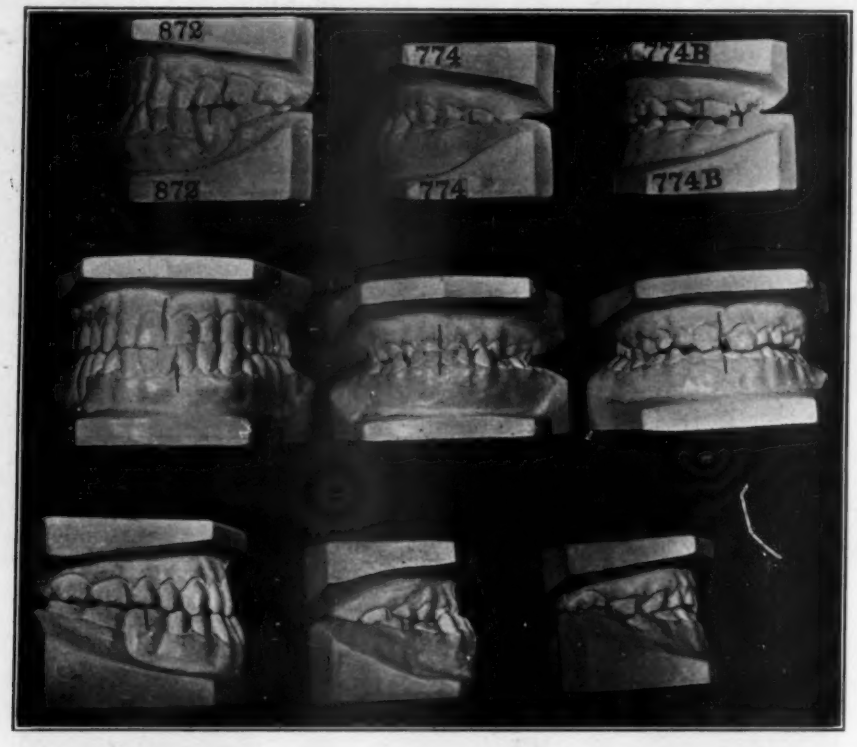
Treatment on Case 1 was begun at 8 years of age and discontinued after 14 months. Treatment on Case 2 was begun at 9 years and discontinued after 13 months. Case 3 began treatment when 4 years old, has continued for 3 years and 3 months, and is still under treatment.

Results Achieved.—Cases 1 and 2 have attained their normal masticatory function with a considerably improved facial symmetry, though both still show an inherited tendency toward a protrusive mandible. Case 3 has greatly improved in masticatory function and facial symmetry but still must be considered far removed from its normal.

Prognosis.—Cases 1 and 2 will continue to develop toward their normals. Case 3 will have to continue under treatment until the tendency toward further mandibular development toward the anterior has ceased.

All three cases will be x-rayed at 12 years of age to ascertain whether or not third molar formation might tend to renew mandibular developments toward the anterior.

Observations and Conclusions.—In this type of malocclusion in which the same malformations are evidenced in one of the parents, one must be most conservative in prognosing restoration of normal masticatory function or facial symmetry to any established or predetermined normal, for the limitation placed by inheritance surely controls the utmost extent of response to mechanical stimulation.



Mother Patient

Fig. 8.—Occluded models of Case 3.

Mother Patient

Fig. 9.—Occlusal views of Case 3.

CLINICAL PHOTOGRAPHY FOR ORTHODONTISTS

MARTIN HAGGETT, NEW YORK, N. Y.

PHOTOGRAPHY has been used extensively by orthodontists for the past twenty years. Together with the plaster models, it has been of great aid in mapping the procedure of straightening teeth and improving facial expression. It is also valuable in keeping efficient records.

Orthodontic photography is essentially different from that used by the general dental practitioner who treats all dental conditions and must show color interpretation and color values. In orthodontics, the structural detail of the face is important, not so much color; therefore, a different approach is necessary to obtain the results desired in the print.

The ideal photography for the orthodontist is the stereoscopic method, as it produces a third-dimensional effect giving height, breadth, and depth to a photograph. This type of picture can be studied at leisure through the stereoscope while the patient is not in the office.

The stereoscopic photograph is taken with a camera with two lenses, which combine slightly different picture images and when viewed through the stereoscope, produce a complete record of the patient's expression and plane alignment. While no other method will produce such roundness and depth, much can be done to get the feeling of roundness in a photograph taken with a single lens. If the lighting is correct, structural detail of the face or plaster cast can be brought out.

In selecting a camera, the orthodontist has a wide choice, depending upon the individual opinion, because for his type of work, there are special cameras designed to enable him to obtain the "before" and "after" pictures at the very same measurements by use of nose boards which indicate the orbital, tragion, gonion, and gnathion. There are, also, clinical cameras in 5 x 7; Graphic cameras in 4 x 5; Recomar and Carl Zeiss. The Contax and Leica represent the miniature cameras. With these types of cameras, the orthodontist has to arrange for his measurements on the ground glass for the orbital tragion or pose the patient with the orbital parallel with the floor.

Lenses differ in their focal lengths, and since the orthodontist has to take close-up views of his patients, the small camera tends to give distortion of the image because of its short focus. Lenses also differ in the amount of light transmitted. Thus, F.4.5 has twice as much area through which light enters the camera as F.6.3; therefore, in order to have the same quantity of exposure on the F.4.5, one must take half the time given for F.6.3. However, with the modern fast films, one could use a slower long focus lens.

For lighting equipment two single reflectors with either photo-floods No. 1 or tubular projection bulb of 400 watts are recommended because they can be moved back and forth to light the patient's face in bringing out the proper perspective. There is an erroneous idea that a great amount of light is necessary

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in making photographs of patients and plaster casts. Such is not the case because, now more than ever, with the fast films on the market, it is not necessary to have much light, but rather to utilize the light in such a way as to bring out the plasticity and roundness of the face, to enable the orthodontist in seeing the picture almost stereoscopically. This will help in studying the case when the patient is not in the chair. Tracing cloth or silk glass screen should be used to diffuse the light.

Most orthodontists have a special table at the chair which makes a good stand for the camera as it can be moved back and forth to the chair. In such a case, the camera has to be focused only once for size and marked off on the track of the camera so that all pictures will have the same relative size by just pushing the camera back and forth until the image is sharp on the ground glass. The camera should be level with the eyes of the patient. When such a table is not used, a tripod can be substituted. An arrangement can also be made to place the camera on the bracket table.

Correct lighting is obtained by placing one light about three feet from the face at a 45° angle at three-fourths angle of face with the patient sitting on the dental chair which has been raised to the height of an ordinary chair. The other light should be placed further back and at the level of the face. The latter light balances the shadows which should look gray in tone and in proper relationship to the main light which is higher and closer to the face. Both lights should be well diffused. Gray background is the best when photographing patients. While black may be used, it has the disadvantage of blending black hair and red lips into the background unless the contours are lit up by a back light.

Intraoral pictures are best lighted by one single light held above the lens, watching that there is no overshadowing on the mandibular teeth.

It is advisable to use photo-flash bulbs when photographing very small children. In such cases, the focusing is done by the regular light which is turned off when the operator is ready to snap the picture and to use the flash bulb simultaneously. The gums and teeth should be swabbed or dried with compressed air.

The lighting of plaster models for front and sides is to be done differently. The lights are both held at the same height, slightly above the side of the model, at a three-fourths angle and moved up or down until the desired roundness and detail are obtained. For photographing occlusal views, the lights are held higher than the model and almost over it until the palate and rugae show in their proper perspective. Black background should be used for all plaster casts.

Panchromatic film should be used in photographing faces and plaster casts. Commercial film may also be used for plaster casts if the casts are clean, as this film produces better contrasts. Commercial film may be developed in red light and therefore, watched. Film should be developed as advised by the manufacturer. Panchromatic film should be developed in total darkness or with a faint green light. It should not be developed in x-ray developer as it tends to make very dense film unless watched very closely.

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Edited by

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DIFFERENTIAL DIAGNOSIS OF SWELLINGS OF THE FACE AND NECK

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IN ORDER to make a correct diagnosis of a pathologic or abnormal condition of the oral structures, several essential factors should be taken into consideration. The difficulty in making a differential diagnosis is due to the fact that clinically edemas in diseases are more often the rule than the exception. The history of the case, the careful study of the clinical picture, radiographic and laboratory findings should be made part of the procedure in making a diagnosis. With all this material correlated, combined with our clinical experience, we arrive at a diagnosis.

PHYSIOGNOMY

The physiognomy (the general outline of the patient's face) should be carefully studied. Is the swelling bilateral (limited to the soft tissues of the infraorbital region); if it is so, it may be the local manifestation of a constitutional disturbance. Renal disease is a fine illustration. Does the edema have the appearance of a maxillary infection, of a mandibular infection, or is it an infection of the soft structures between the jaws, as in the case of an involvement of the corpus adiposum bucci? Following this inspection, careful digital palpation should be made to determine whether the swelling is hard, soft, does it fluctuate, or is it painful to the touch? Following this examination, a careful history should be taken.

ACUTE DENTOALVEOLAR ABSCESS

A majority of the edemas are usually due to acute dentoalveolar abscesses (Figs. 1 to 4). The patient presents with the cardinal symptoms of inflammation, pain, edema, redness, etc. Clinically the examination reveals a carious tooth. Radiographically, a tooth may show evidence of either apical or lateral (parietal or periodontal) rarefaction. The history reveals that the pain was severe for two days and is now subsiding. This is typical of an acute dentoalveolar abscess. The pain persists while the inflammatory exudate burrows through the bone and then is minimized when it enters the soft tissues. This type of swelling may be present in the maxilla or mandible, located buccally, lingually, or palatally in the oral cavity. It offers the least difficulty in the making of a diagnosis.

INFECTIONS FOLLOWING THE USE OF LOCAL ANESTHESIA

Infection following the inferior dental injection (Fig. 5). A patient returns three or four days after the removal of a tooth, complaining of difficulty in swallowing, with partial or complete trismus, pain, and intermittent fever. On examination, the socket appears normal. We should, therefore, think of the

Fig. 1.—Photograph of acute dentoalveolar abscess, mandible. The edema is buccal to the mandible and extends below the inferior border of the mandible.

Fig. 2.—Acute dentoalveolar abscess of the maxilla pointing externally. Patient appears to have the academic symptoms of fluctuation.

presence of an infection, either in the tissues on the lingual surface of the mandible, in the region of the angle, or in the retropharyngeal area. Hourly irrigations of hot saline solution should be advised, with cold compresses applied extraorally, preferably an ice collar. The patient should be directed to return for observation. If fever is present, the patient should be kept in bed. At the

expiration of eight or ten days, if resolution has not occurred with the aid of these irrigations, fluctuation will most likely be present, discernible by digital palpation.

Fig. 3.—Intraoral view of previous case, typical fluctuating mass in the mucobuccal fold. In this type of case incision should be made close to the bone.

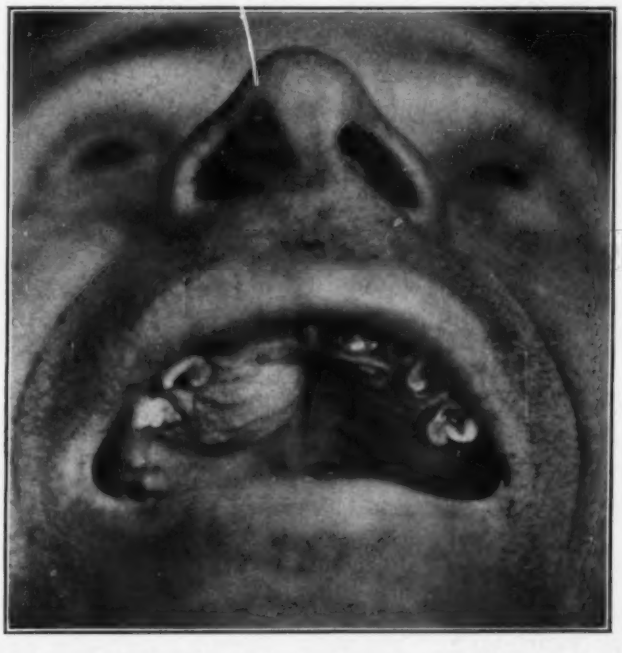

Fig. 4.—Photograph of acute dentoalveolar abscess pointing on the palate.

It is my opinion that when trismus exists under these circumstances, a general anesthetic should not be given for the purpose of forcing the patient's

mouth open without pain. There may be an edema of the glottis which would militate very materially against this patient's recovery from a general anesthetic. The examination of the structures in the floor of the mouth may be made without an anesthetic. When fluctuation is present, and not until then, the area should be opened, preferably with a blunt instrument.

No drain should be inserted into the wound lingually, and the hot saline irrigations should be continued. This treatment, in most cases, affords relief with an uneventful recovery.

There are other cases, however, where the pointing process toward the external surface continues. This may happen even when intraoral drainage has been successfully established. Under these circumstances, it is best to substitute hot dressings for the cold compresses, and every effort should be made to aid the pointing process so that extraoral drainage may be instituted as early as possible. Surgical judgment must be exercised to avoid the need for applying prolonged external hot applications. In prolonged treatment of this kind the skin may rupture, and the result will be an ugly scar on the face.

Fig. 5.

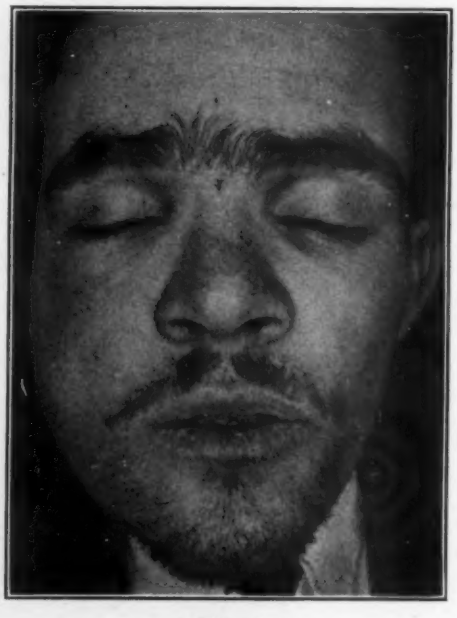

Fig. 6.

Fig. 5.—Photograph of a patient suffering from postanesthetic infection. An inferior alveolar injection was given in this case. Notice the edema, involvement of the soft tissues beneath the inferior border of the mandible and toxic appearance of the patient.

Fig. 6.—Photograph of postanesthetic infection in which a posterior superior alveolar injection had been made. The swelling is buccal and midway between the maxilla and mandible. Symptoms are typical of any infection.

INFECTIONS FOLLOWING POSTEROSUPERIOR DENTAL INJECTION, OR THE SO-CALLED TUBEROSITY INJECTION

"Open your mouth wide," is a very common expression used by the dental surgeon when making a novocain injection. However, in this particular injection, the half-open mouth is the correct procedure to follow. It has been found that this position of the patient will aid in the thorough retraction of the soft

tissues of the cheek. In the region of the maxillary first molar, there is situated in the cheek a small gland called the corpus adiposum bucci, or sucking pad. Unless the tissues of the cheek are thoroughly retracted, the needle may inadvertently be inserted into the mucous membrane of the cheek instead of the mucous membrane covering the alveolar process of the jaw. As a result, the corpus adiposum will be infiltrated with the anesthetic fluid, producing a swelling of varying degree. It was not the intention to insert the needle in this region. Therefore, it is more than likely that the surface had not been sterilized. Consequently there is danger of carrying some of the bacteria into this sucking pad and disseminating infection into the tissues beyond. When this condition occurs, hot saline irrigations should be employed. If fluctuation occurs, incision and drainage are indicated.

INFRAORBITAL INJECTION

This injection should be made directly above the mucobuccal fold, distal to the canine eminence. When the injection is thus made, the danger of ecchymosis is very materially, if not entirely, reduced. Ecchymosis, following this injection, is due to the failure to keep in mind the regional anatomy of the part. The infraorbital plexus is situated directly between two muscle layers. It can readily be seen that if the needle is inserted too close to the outer surface, it may penetrate the fibers of the quadratus labii superioris alaqu nasi muscle. If it is inserted too close to the mucous membrane of the maxilla, it may penetrate the fibers of the caninus muscle. In either case, the withdrawal of the needle will be followed by effusion of venous blood into the interstices of these tissues, resulting in subsequent discoloration. This condition is treated by the application of cold compresses for twenty minutes in every hour, for approximately twenty-four hours. The patient should be advised not to worry about the peculiar discoloration which may occur, assuring him it will disappear in eight or ten days.

LUDWIG'S ANGINA

This is a streptococcal infection of the tissues in the floor of the mouth leading to an acute cellulitis of the neck. The condition usually arises from an infection in the floor of the mouth, or the tonsillar region, through which the organisms gain entrance. It is most common in adults, but may also occur in young children. It is a particularly grave and very often fatal disease. In making injections on the lingual surface of the mandible, or in the tissues of the floor of the mouth, great care must be exercised in carrying out the proper aseptic and technical procedures. The area must be made as dry as possible, and the surface bacteria should be completely fixed.

In a few hours, after the onset of the disease, the floor of the mouth becomes hard and brawny. The tongue is inflamed and thrust upwards against the roof of the mouth, while the skin in the submental or submaxillary regions becomes indurated and dusky red in color. The swelling soon spreads to the side of the neck and may extend down to the clavicle. Trismus and dysphagia manifest themselves, sometimes accompanied by dyspnea which is due partly to the swelling of the tissues in the neck, but mainly to the spread of the inflammation

backward, giving rise to edema of the glottis. The temperature is high, reaching between 104° and 105.5° F. It drops later, however, the patient showing symptoms of severe systemic infection. The majority of cases terminate fatally, usually in four or five days.

Fig. 7.—Ludwig's angina. Characteristic cellulitis, hard and boardlike swelling beneath the mandible, running from ear to ear.

Fig. 8.—Photograph of a clinical appearance of pericoronitis. The tissues lingually, distally, and buccally surrounding the partially erupted third molar are inflamed. The other clinical symptoms are trismus, difficulty in deglutition, and pain.

Treatment.—Immediate heroic treatment is indicated. Sulfanilamide, sixty to eighty grains in twenty-four hours for two or three days, may be administered. Should cyanosis manifest itself, the dose must be reduced or completely stopped. In these conditions we cannot wait for the academic symptoms of fluctuation to

appear. Liberating incisions through the deep fascia followed by separation of these tissues by means of hemostats and the finger, to relieve the pressure on the glottis, are lifesaving measures. When liberating incisions fail to relieve embarrassment to respiration, tracheotomy should be resorted to.

PERICORONITIS

The next pathologic condition that the dentist may be called upon to diagnose and treat is acute pericoronitis. This is caused by an infection around the coronal portion of the teeth, usually occurring in the third molar area. The infection is usually unilateral in character and rarely bilateral. This term is derived from the prefix peri, meaning "around," and corona, meaning "crown."

Academically, these infections may occur around the crown of any partially erupted tooth. Clinically these infections are limited to the region of the mandibular third molar. A study of the regional anatomy of the third molar area will indicate the cause for the frequency of the occurrence of these infections. The objective signs are readily discernible. One may observe areas of ulceration, suppuration, and an extreme tenderness in the region. The crown of the tooth may be visible, partially visible, or may be entirely obscured.

A distinct swelling may be present on the lingual or buccal surface of the mandible. Fluctuation may also be present on the lingual or buccal surfaces of the mandible. In some cases, the swelling on the lingual surface extends to the anterior pillars of the fauces. Trismus, partial or complete, is usually a concomitant symptom.

The subjective symptoms include difficulty in swallowing, pain, offensive breath. Depending on the severity of the infection it may be accompanied by systemic disturbances, such as rapid and weak pulse, fever, chills, constipation, coated tongue, and malaise.

Fig. 9.—Photograph of patient showing the clinical picture of individual suffering from an infection resulting in venus cavernous sinus thrombosis. Notice the proptosis of the eye and swelling of the opposite side of the face.

VENUS CAVERNOUS SINUS THROMBOPHLEBITIS

To illustrate the clinical course of this type of infection, a typical case history is cited (Fig. 9).

A boy, 12 years of age, presented at the office for consultation five days following the removal of a mandibular right first molar. Upon clinical examination it was disclosed that a moderate swelling was present on the right side of

the mandible, pointing toward the external surface. The other signs were redness of the left eye, accompanied with slight swelling. The patient complained of a severe headache; the temperature was 104° F.

The oral examination disclosed that the mucobuccal fold opposite the unhealed socket of the extracted tooth was torn open, exuding foul-smelling pus and some blood.

The patient was hospitalized immediately and given the usual care systemically. Hot boric compresses were applied externally on the right side of the face. The following day, the classical symptoms of fluctuation appeared, and extraoral drainage was instituted. The swelling of the left eye increased. The proptosis was marked, as shown in the illustration. On the third day there was a hemorrhage of the left eye; both eyes were closed; the patient was delirious, vomiting, unable to swallow, and death followed directly. The autopsy revealed both cavernous sinuses filled with pus. A diagnosis was made of venus cavernous sinus thrombophlebitis.

LYMPHADENITIS

Errors in diagnosis are responsible for the many teeth removed unnecessarily. An acute swelling in the submaxillary region is mistaken for an acute dentoalveolar abscess. Radiographically, the dental arch in these cases is negative. We must not overlook the fact that this condition may be a lymphadenitis and may accompany an ulceration of the oral soft tissues or tonsils (Fig. 10). These lymphatic swellings are never accompanied by trismus.

RANULA

The ranula is another condition in the mouth that may lead to a faulty diagnosis (Figs. 11 and 12). The swelling is an acute, painful enlargement of the submaxillary salivary gland due to an obstruction of Wharton's duct. Calculus and not the teeth cause the obstruction. Radiographically, the teeth are negative.

The patient generally gives a history of several previous attacks, with an increase in pain and swelling during meals (salivary colic). The main and guiding symptoms are edema, tenderness under the tongue, and difficulty in swallowing. For diagnostic purposes, both bite films and lateral plates should be taken to disclose the presence of the stone in the soft tissues.

At times, the edema in the floor of the mouth may assume clinically, a picture of the belly of a frog. This clinical condition is called ranula. The interpretation of radiograms should be carefully done. The lateral x-ray plate may disclose what appears to be a foreign body in the mandible, while the bite film may appear as if a foreign body were in the soft tissue.

The presence of any glandular involvement of the parotid, would necessitate the making of differential diagnosis of mumps, syphilis, tuberculosis, and possibly a lymphosarcoma.

MUMPS

Mumps is an acute, specific, infectious disease of the parotid gland. Inflammation of testes or the ovaries may or may not be present. There is an incubation period of fourteen days. We observe malaise, headaches, and a temperature anywhere from 101° to 103° F. The parotid and submaxillary glands

Fig. 10.—Photograph of patient with cervical lymphadenitis due to tuberculosis.

Fig. 11.—Photograph of a typical clinical picture of ranula.

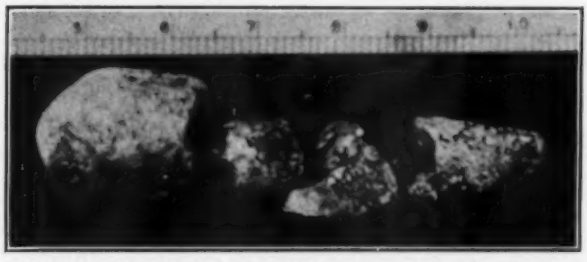

Fig. 12.—Photograph of calculus removed from the floor of the mouth, in the previous case.

are inflamed. The edema involves the cheek and neck. The subjective symptoms are pain at the angle of the jaw, pain on mastication and deglutition. Salivation is increased, and the hearing is affected.

TUBERCULOSIS

Tubercular, glandular symptoms are usually present in children. The glands of the neck become infected. There may be a direct infection by the tubercle bacillus from the oral cavity. They are soft, painless, may either suppurate or become calcified. Radiographically, we find calcified tubercular glands; syphilis or gumma must be ruled out in these glandular conditions. A Wassermann test, a spinal tap, and comprehensive case history will help to differentiate tuberculosis from gummatous glands.

LYMPHOSARCOMA

Another condition, closely resembling the latter group is lymphosarcoma or Hodgkin's disease (Fig. 13). Clinically we observe swellings of the lymph glands which are painless. The other glands of the body are also involved. The condition is associated with a profound anemia.

The cause is unknown but is thought to be associated with leucemia. It is of an infectious origin. There is usually present hypertrophy of one or two glands. The spleen and liver are usually enlarged. The red blood cells decrease, heart action is impaired, and cachexia is present.

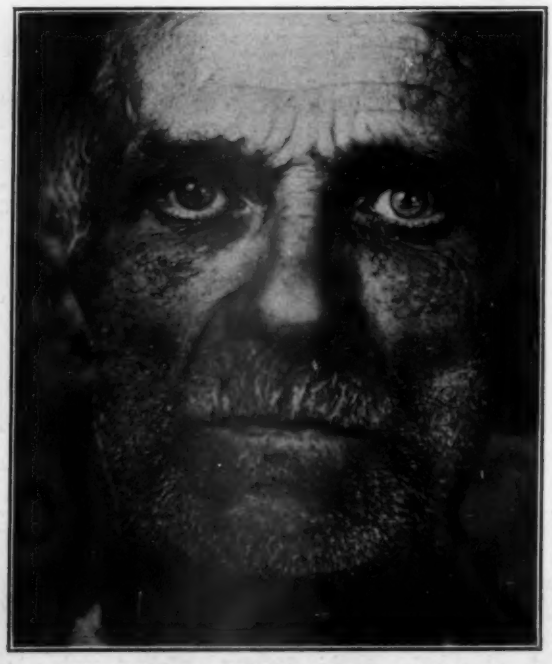

Fig. 13.—Photograph of patient with Hodgkin's disease. Notice the bilateral glandular involvement.

MYXOMATOUS DEGENERATION OF SALIVARY GLANDS

At times, we find salivary gland tumors in the midline of the palate. These must be differentiated from an acute dentoalveolar abscess, a cyst, and torus palatinus. These salivary glands undergo a myxomatous degeneration, appear bluish in color, soft, and as fluctuating swellings in the roof of the mouth.

TORUS PALATINUS

Torus palatinus appears as a swelling on the palate, usually in midline (Fig. 14). Clinically, it resembles a palatal abscess, especially when it is inflamed. It is really a hard, firm, bony mass. It is usually noticed by the patient when it becomes irritated, or when prosthesis is advised. It is a harmless, bony growth and can easily be removed, when indicated.

LINGUAL CONCRESCENCES

An enlargement resembling the above condition may be noticed on the lingual surface. Digitally, bony swellings are firm and hard. They are really bony concrescents or dystrophies of bone. No symptoms are present in this type of abnormality other than the patient's experiences of discomfort from dentures.

OSTEOGENESIS

A patient may present with a large, hard, swelling either in the mandible or the maxilla. Such a patient may never have had symptoms of any kind, but this edematous area is getting progressively larger, and the features show a very distinct bulge. Upon clinical and radiographic examination, we find another type of bony growth. It is a new growth of bone and is designated as osteogenesis (Fig. 15).

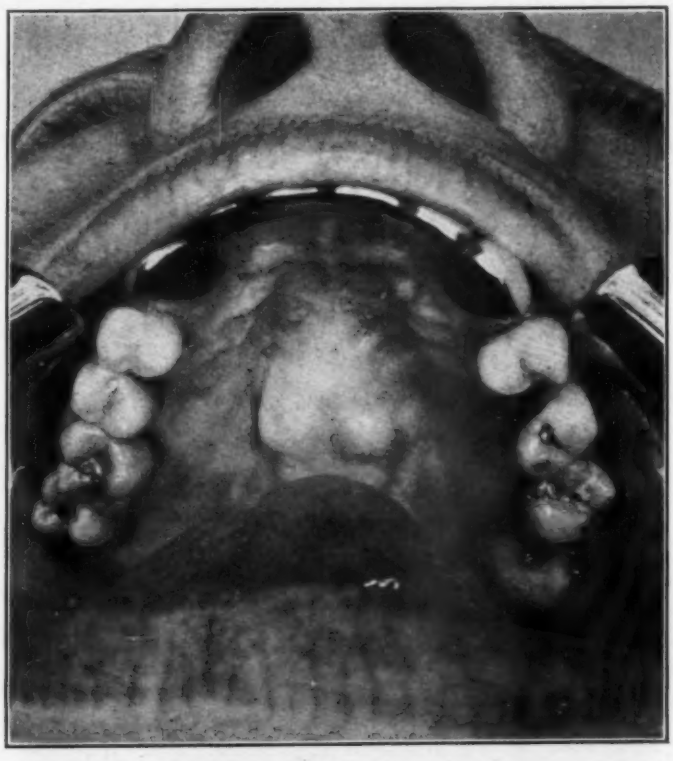

Fig. 14.—Photograph of torus palatinus. In this type of case surgery is not indicated. The area is not ulcerated, and no restoration is to be made.

The stimulation of the cells in the bone is usually caused by a carious tooth. This bony tumor is benign in character.

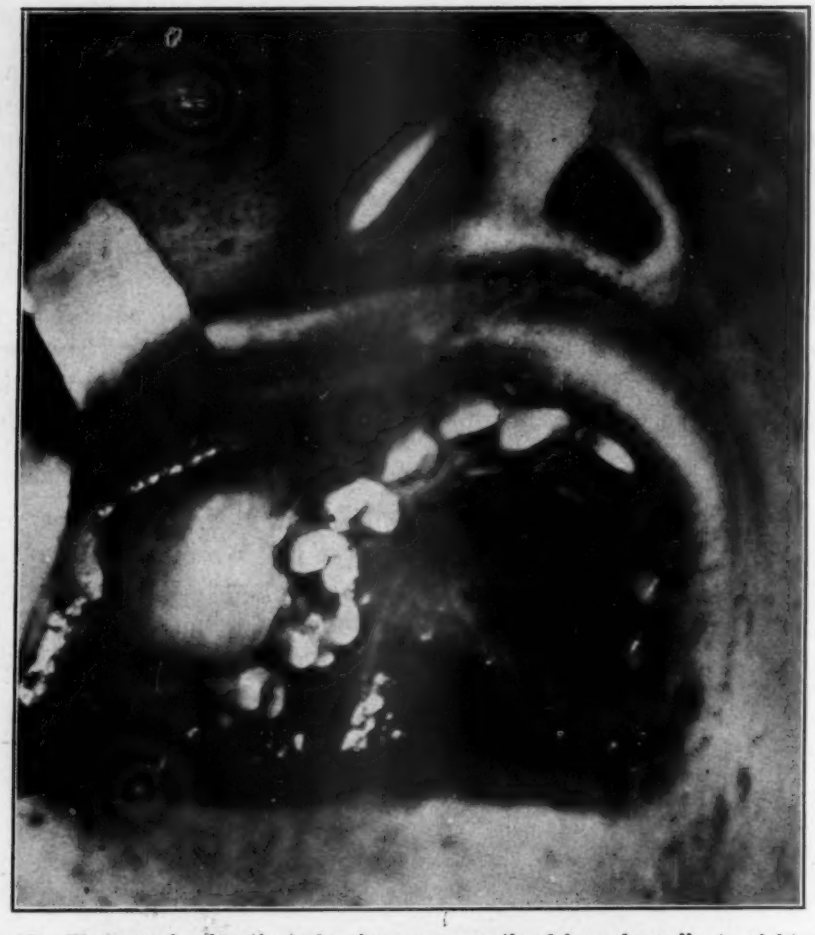

Fig. 15.—Photograph of patient showing new growth of bone buccally to right maxillary molars. It is firm and hard. The mucous membrane is normal. Pathologically this is known as osteogenesis.

Fig. 16.—Photograph of maxilla showing clinical evidence in the mouth of patient with Paget's disease.

ANGIONEUROTIC EDEMA

Angioneurotic edema is a type of swelling which comes on suddenly and is very alarming to the patient. Radiographically, the area is negative. There are no subjective, painful symptoms. The patient feels a slight itching on the skin. This condition is a form of urticaria. It is usually caused by an idiosyncrasy of the patient to certain foods or drugs. Clinically, it resembles a typical acute dentoalveolar abscess.

PAGET'S DISEASE

Paget's disease (osteitis deformans) is a chronic bone dystrophy which may also affect the oral cavity (Fig. 16). Clinically, we find enlargements on either jaw. There are no subjective symptoms. More frequently the maxilla is involved with an enlargement in the infraorbital region. Radiographically, radiolucent and sclerotic areas may be observed. A biopsy will confirm our findings. This is thought to be due to an endocrine disturbance.

Fig. 17.—Photograph of anteroposterior x-ray plate showing a definite cloudiness and infection of the left maxillary sinus (antrum of Highmore).

ACUTE MAXILLARY SINUSITIS

Acute sinus conditions come to the attention of the dentist, presenting facial swelling usually located in the infraorbital regions (Fig. 17). The dentist may

be called upon to diagnose these swellings and then not treat them. A patient with such a condition usually believes that the slight swelling and the pain of the maxillary premolar area are due to infected teeth. The radiographic findings may be positive or negative. Clinically, the patient complains of severe pain in the area involved. The condition is usually unilateral in character, and a heavy

Fig. 18.—Photograph of a child, aged 7 years, who presented with hard, walnut-sized mass, buccally in the canine region, with a bulging of the palate and slight ulceration. The cheek was swollen and red. The patient complained of a great deal of pain. The case had been diagnosed as an abscess, and the patient was not referred to this clinic until eight weeks after the swelling became apparent. Biopsy showed round-cell sarcoma.

Fig. 19.—Photograph of patient presenting with swelling right upper maxillary region, history of two years' duration. Large, immovable hard mass, size of hen's egg, anterior to the malar process. The bulge extended from the infraorbital ridge to the cervical margins of the teeth and anteroposterior from the ala of the nose to the second molar. Mucous membrane was normal. Patient complained of pain in the premolar region. Biopsy report: osteogenic sarcoma.

mucous is discharged from that side of the nose. An anteroposterior plate will show a definite cloudiness of the involved antrum.

TUMORS OF THE ANTRUM

The need of making a proper diagnosis in the treatment of mouth lesions may be best illustrated in cases of tumors in the antrum (Figs. 18 to 21). There is usually a unilateral edematous area present over the premolar region, resembling an acute dentoalveolar abscess or possibly an acute sinus infection. The teeth in the area are painful, especially to percussion. Many patients complain of an atypical neuralgic pain.

A factor in differential diagnosis is that in an acute dentoalveolar abscess, the edema is continuous with the orbit of the eye, while in this condition definite depression may be observed below the lower eyelid.

Fig. 20.—Photograph of anteroposterior radiographic view of the same case showing solidification of the right maxillary sinus.

Radiographically, the sinus is definitely cloudy, and there is a destruction of the bony walls. These tumors grow in any direction; when they grow outward and downward, an arching of the palate is seen, the teeth are loosened; and the patient experiences toothache. A biopsy will establish the final diagnosis.

CYSTS

Cysts present a subject for special consideration. The discussion of cysts is included in this paper as a means of aiding in differential diagnosis. Cysts appear as swellings, usually when they have grown in size and have broken through the walls. Inasmuch as cysts do not cause any pain, their growth in

Fig. 21.—Photograph of patient showing clinical evidence of growth in the antrum. Edema does not seem to be continuous with the eye. There is a slight depression under the eye. This is one of the points in differential diagnosis, in discerning the difference between a growth and an acute dentoalveolar abscess in this area.

Fig. 22.—Photograph of patient showing the extensive bulge of a radicular cyst. In this particular case there was no outer plate of bone, the cyst being beneath the mucous membrane.

the interior of the jaw bones may go on without notice by the patient. As the cysts increase in size, the jaw bone is gradually distended as a consequence. The bone is attenuated to an extent that it finally becomes eggshell-like in consistency.

When the tumor becomes visible externally, at this stage it projects from the jaw and is marked by sharp borders. If the softening of the bone has progressed sufficiently one may observe a sharp edged bone by palpating at the highest point of the swelling. One may also feel a pulsation of the cystic sac at this stage, when the parchment-like crepitation will clearly be detected. The faint bluish, glossy appearance of the cyst can be seen through the mucous membrane covering the tumor.

Fig. 23.—Photograph of extensive cyst in the premolar and molar region extending into cheek.

Fig. 24.—Photograph of patient showing distinct bulge of the right maxilla due to underlying cyst.

Cysts tend to develop in the direction of least resistance. During the process of this development, they usually form a convexity in the buccal wall of the mandible and in the buccal or palatal wall of the maxilla, according to their

place of origin. Cysts which emanate from the maxillary premolars or molars usually project into the antrum of Highmore. They are even able to embrace most of the maxillary cavity so that ultimately this cavity is confined to only a small area (Figs. 22 to 26). In the mandible, cysts occur mostly on the angle

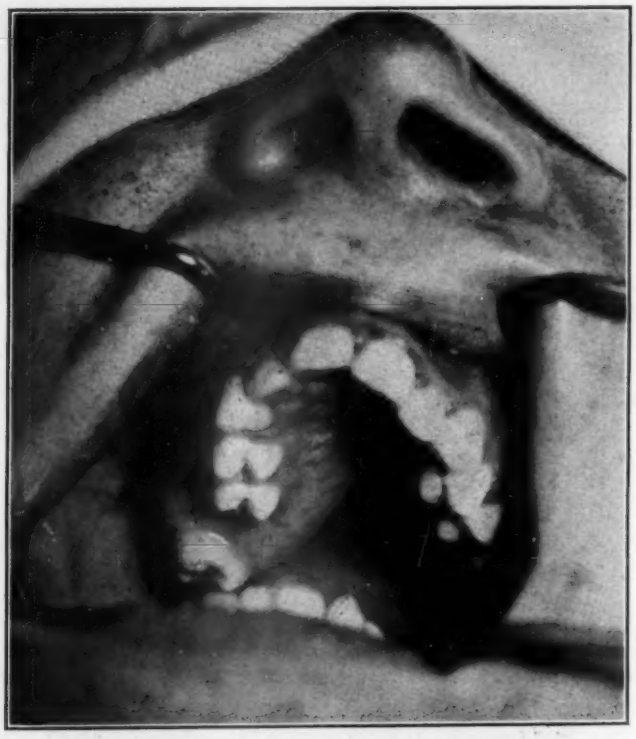

Fig. 25.—Photograph of intraoral view of the previous case, with particular attention paid to the distention of both buccal and palatal plates due to the presence of the cyst.

Fig. 26.

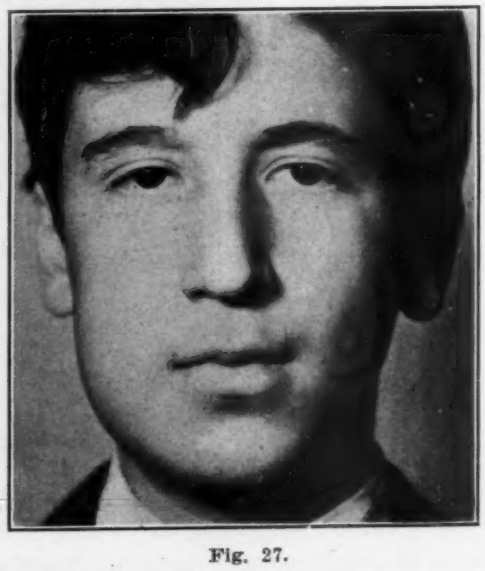

Fig. 27.

Fig. 26.—Radiogram of previous case, evidence of radicular cyst in the area.

Fig. 27.—Photograph of patient presenting a bulge of the right mandible. This slight edema has been increasing in size with no apparent subjective symptoms, except for altered physiognomy.

of the mandible and on the ascending ramus (Figs. 27 and 28). The latter, which always emanate from the third molars, deserve special consideration.

The cystic content consists of a serous, slightly mucous fluid. Fat is always present. Cholesterin is not present as often as in dental root cysts, but more frequently than is generally assumed. When the content appears purulent or filthy, it is due to some external infection, such as may be caused by surgical measures (puncture or incision). Infection of the cystic content can also be produced by adjacent granulomas.

On account of their location and size, follicular cysts may be wrongly diagnosed. Through perforation of the antrum of Highmore or the nose, they are sometimes erroneously diagnosed as empyema of the antrum, especially if the cystic content contains pus; otherwise complications are rarely observed.

Fig. 28.—Radiogram of previous case showing dentigerous cyst of the mandible.

CYSTS AND MALIGNANT GROWTHS

Generally speaking it is not very difficult to make a differential diagnosis of a cyst and malignant growths. Malignant tumors, such as sarcomas and carcinomas, grow faster than do cysts. These tumors have an irregular, humpy structure, accompanied by an ulcerated surface. Contrasted with this clinical appearance of tumors, the surfaces of cysts are smooth. In tumors, the swelling of the regional lymph glands occurs, and in the advanced stages of the disease cachexia is present. In cysts, the lymph gland infections are seldom present, and cachexia is never encountered.

In contrast to cysts, malignant tumors do not confine themselves to their own structures but involve the adjacent tissues as well. In spite of these distinguishing features, cases have been reported in which the diagnosis seemed dubious. A good radiogram, and possibly a test puncture and a biopsy, will in most cases enable the operator to make a correct diagnosis.

Cysts which project into the antrum frequently give rise to many difficulties in the making of a diagnosis. The clinical test irrigations, illuminations, and the radiogram taken together will aid in establishing a diagnosis.

ADAMANTINOMAS

The adamantinoma is really a hard, jaw tumor and has also been called multilocular cyst or multilocular cystoma. These tumors rarely occur in the maxilla, but most often in the mandible. They are of various sizes, ranging from small cystic cavities to extremely large ones, extending to the entire mandible. They may appear at any age. They are slow in growth. Occasionally, they grow rapidly and within a few years reach a large size. In our experience, their sex is of no special diagnostic significance. They occur usually in persons between the ages of twenty and thirty years, although we have seen these tumors in patients of middle age and also in children.

Fig. 29.—Photograph of patient, diagnosed as adamantinoma. Notice the edema just buccal to the mandibular molar region.

DIFFERENTIATION BETWEEN CYSTS AND ADAMANTINOMAS

A survey of statistical reports will disclose that adamantinomas appear much oftener than has generally been supposed. The ill-end results in some of these cases make it essential to resort to proper treatment at the very outset. Therefore, it is important to stress the value of a correct diagnosis in these conditions (Figs. 29 to 31).

For similar reasons, it is essential to differentiate more precisely the common cyst from adamantinomas. Adamantine tumors have been reported as early as 1868. They were then designated as odontomas. The same neoplasm has been given various names. The following will be mentioned: adamantine epithelioma, cystosarcoma, adenocarcinoma, epithelial odontoma, cystoma, cystic tumor of the jaw, multilocular cyst of the jaw, adamantine tumor, chorioblastoma, and ameloblastoma.

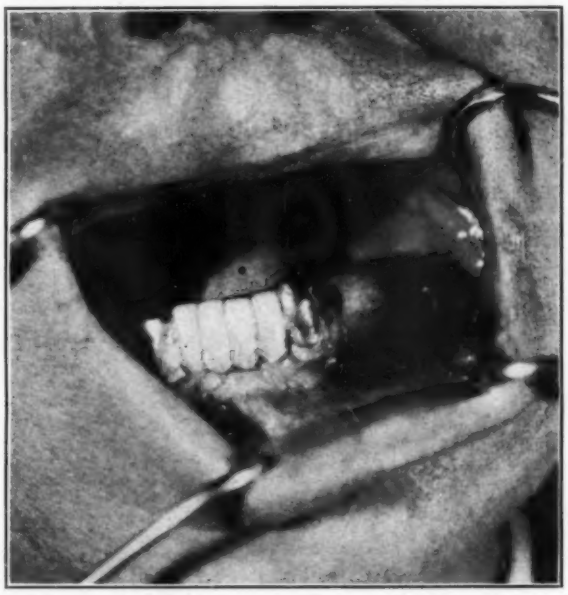

Fig. 30.—Photograph of patient, previous case, intraoral view shows the distinct bulge of the area.

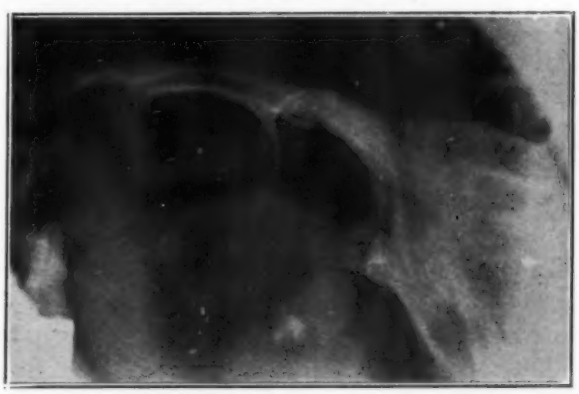

Fig. 31.—Photograph of x-ray plate, previous case, showing typical cystlike areas in the region.

Due to the many divergent views concerning the histogenesis of these tumors, those of dental origin have been classified in a most inadequate manner. Some have proposed a classification of cysts on the basis of the derivations of the tooth germ, while others have suggested a classification on the basis of their being the products of inflammation. Adamantine tumors are sometimes classified as unilocular or multilocular. Nevertheless, the unilocular cysts which are diagnosed as such, will radiographically indicate the presence of a large num-

ber of smaller cysts. This point should be borne in mind as an aid in recommending the proper method of treatment.

The usual classification of these tumors, on the basis of their being solid or cystic, is impractical. It will be found, in the transitional type, that one part of the tumor is solid, while another part of the same tumor is cystic. From the standpoint of prognosis, however, it is important to bear in mind the care of these tumors, whether they are solid or cystic, single or multilocular.

CLINICAL AND RADIOGRAPHIC DIAGNOSIS

It is difficult to make a final diagnosis based on clinical findings exclusively. The clinical examination should be supplemented by a radiographic study of the case. Radiographically, on the other hand, it is difficult to distinguish between an adamantinoma and a benign giant-cell tumor of central origin, or an osteitis fibrosa cystica. The x-ray shadows show no structure of any kind in the follicular cyst; the tumor generally stands out in sharp relief from the rest of the healthy bone (Figs. 32 and 33). In adamantinoma, on the other hand, the honeycombed structure may be seen with the aid of the radiograph. The radiographic examination shows these latter tumors to be of a honeycomb appearance, consisting of cavities or hollows arranged in one or more compartments within the jaw bone.

THE MEANING OF LOCAL MALIGNANCY

Adamantinomas are locally malignant in the sense that they may recur in the jaw over and over again, unless the tumor is thoroughly removed, leaving no vestiges of any kind. This can best be accomplished by means of radical surgery. We have seen cases treated with conservative methods where it became necessary later on to resect the entire jaw. Were these same cases treated radically and were a thorough job done in the first place, better results might have been obtained. Such patients need not be subjected a second time to major surgical treatment and lose the entire jaw, if proper surgery is instituted in the first place.

These tumors do not metastasize to the degree which malignant tumors usually do. However, cases of metastasis have been reported.

SYMPTOMATOLOGY

These patients present no early symptoms, a characteristic of most slowly growing tumors. This explains why patients come for treatment at that stage when the tumor reaches its maximum development. The disturbing symptom in these cases is not pain but the disfigurement of the jaws. Sometimes a facial defect compels the patient to seek advice at the oral surgeon's office. Occasionally these tumors rupture into the mouth, and when they do not heal, they may become infected, simulating a condition of osteomyelitis. Sometimes a loose tooth may be the cause for complaint. In large cysts, the speech and mastication may be interfered with. The outstanding characteristic noted in these cases is the unevenness and the lobulated appearance of the tumor. This is seen especially in the radiogram.

These tumors are centrally expansive growths. They are observed only at a later stage and are not diagnosed in their incipiency. Sometimes they are con-

fused with dentigerous and radicular cysts. According to some observers, they are more common in the colored race than among white people. Others believe that these tumors appear more often in females than in males.

Fig. 32.—Photograph of lateral plate radiogram showing osteitis cystica fibrosa. Cystlike formations are present containing sclerotic areas.

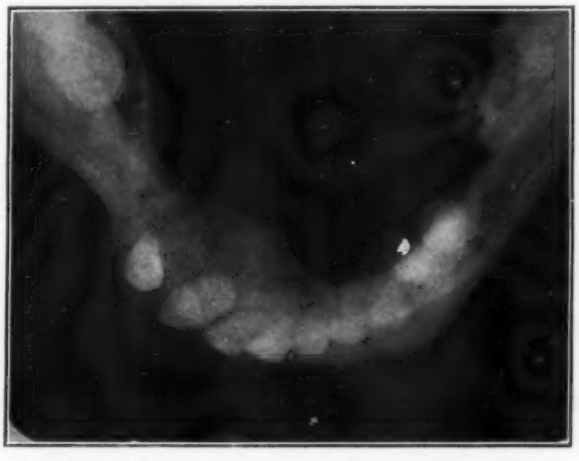

Fig. 33.—Photograph of bite film of previous case.

CLINICAL PATHOLOGY

We recognize two clinical types, the cystic type which is more common, and the solid type which is more or less rare. Clinically, the adamantinoma resem-

bles the radicular, or dentigerous cyst. According to their origin, there are those that spring from the epithelial borders, and those which are situated deep in the alveolar process.

The mass is usually traversed by massive fibrous tissue trabeculae, which make up the bulk of the tumor. This stroma may be very cellular. The characteristics of the adamantinomas are masses of epithelium and broad anastomosing strands of epithelial cells. The epithelial masses undergo central degeneration and liquefy, leaving central cavities in which fluid accumulates. These tumors involve the surrounding bone in a different manner than do the dental root cysts. While in the latter type the cavity is clearly defined, as seen in the radiograph, the cavities are uneven, lobulated, and irregular. The fibrous capsular wall of the adamantinoma adheres to the bone, indicating that small filaments of the tumor tissue may extend from the capsule into the bone proper.

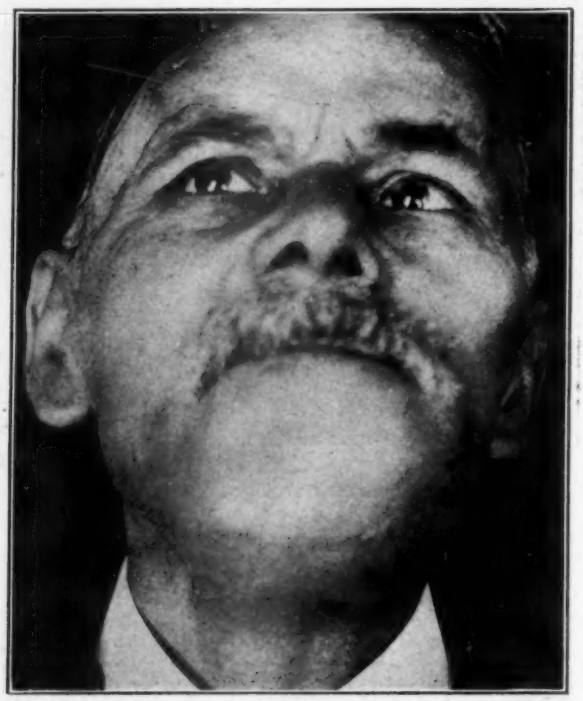

Fig. 34.—Photograph of patient suffering with carcinoma. Typical hard, boardlike, indurated swelling extending from the molar region and including most of the anterior portion of the mouth.

OSTEITIS CYSTICA FIBROSA AND CENTRAL BENIGN GIANT CELL SARCOMA

Two conditions are met which may present the same clinical picture as does the cyst, osteitis cystica fibrosa and the central benign giant cell sarcoma. In each case, we may have a typical bulge or the so-called swelling. Symptomatically, there is little or no pain in osteitis cystica fibrosa, while the giant cell sarcoma is more painful. The radiograph and the biopsy are the most valuable adjuncts in diagnosing these bone lesions.

Radiographically, the osteitis cystica fibrosa presents this picture. The cortex is intact. It may be thinned out or slightly expanded but is never perforated, unless some pathologic factor enters into it. The radiograph dis-

closes monolocular or multilocular radiolucent areas. There is no white line about the periphery, the outline not being well defined. This is differentiated from the radicular cyst where a definite outline is present. Usually, these cases are not discovered until a later age. Their progress is very slow.

Radiographically, in the central benign giant cell tumor which resembles the osteitis cystica fibrosa closely, we may be able to disclose a soap bubble appearance. The cortex is also expanded and thinned out. The development is very rapid. They are benign in character.

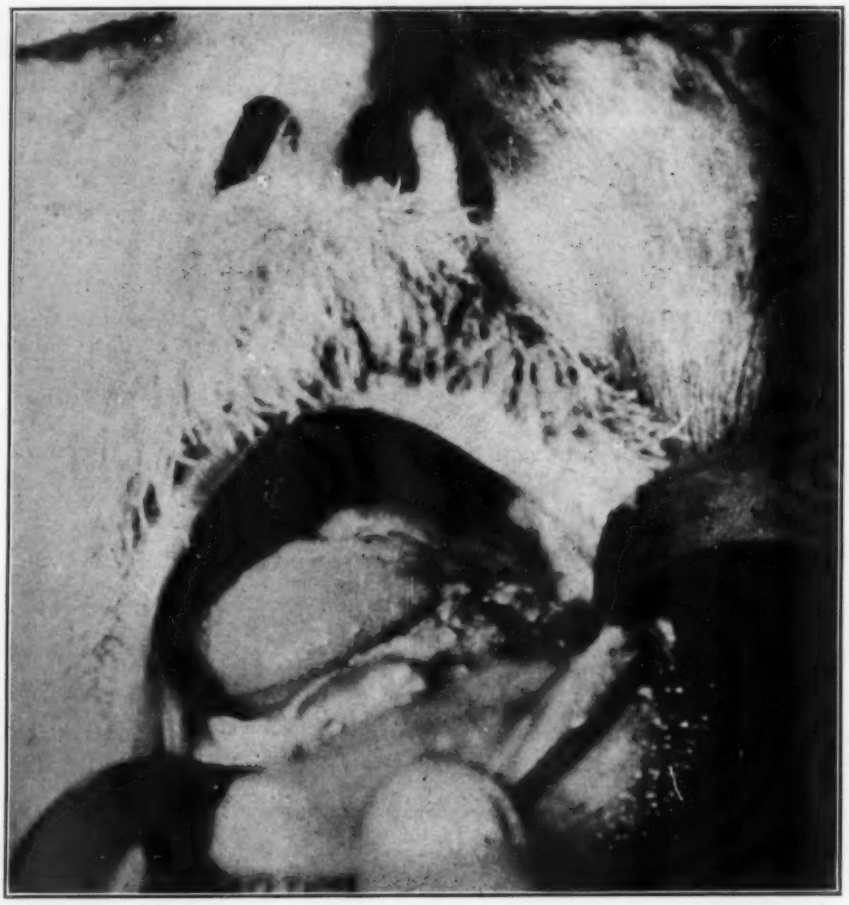

Fig. 35.—Photograph of previous case showing intraoral view and carcinomatous area present.

MALIGNANCIES

In a study of swellings, one must give consideration to malignancies (Figs. 34 to 38). Cancerous growths, as they progress, present clinically an enlargement of the lymph nodes, pain, depression, or intoxication known as cachexia. A profuse discharge and fetid odor are characteristic. The extension of the growth usually produces a hard, indurated area, giving the appearance of a swelling. If the growth involves the tongue, there is difficulty in speaking and deglutition. The tongue becomes practically fixed. Other symptoms are extreme pain and the loss of weight.

Radiographically, malignant growths start from one point and involve the bone equally in all directions. They destroy the cortex entirely. The radiograph never discloses the formation of new bone. Carcinomas usually show alveolar absorption. Clinically, the loosening of the teeth takes place in the area involved. The surrounding gum tissue is painful and resembles a pyorrhetic condition. Biopsy of all suspicious growths should always be taken to confirm the clinical findings.

MUCOUS CYST

The mucous cyst is generally the result of trauma which causes blocking of the lymph vessels. These cysts appear as grayish white, noninflammatory translucent tumors. They are painless in character and have a sense of fullness and discomfort. The biopsy will confirm the diagnosis.

Fig. 36.—Typical swelling of lower right side of face of patient giving clinical and radiographic diagnosis of osteogenic sarcoma.

ANEURYSM

A swelling which may occur in the region of the neck and which may be mistaken for a growth or a glandular involvement is an aneurysm (Fig. 39). An aneurysm is a sac formed by the dilatation of part of an artery which is filled with blood. The conditions which weaken the arterial wall or increase the blood pressure are the direct causes of aneurysm. They may be the result of an old injury, syphilis, chronic nephritis, blood poisoning, plethora, and hypertrophy of the heart. The indirect causes are the environment and habit of individuals. Aneurysms usually occur between the ages of thirty and fifty years. Males are more affected than females.

Clinically, we find the area edematous to a varying degree. Pain is present, and the pulsations at times are very marked. The skin may be of a bluish color. Aneurysms differ from growths in that the latter have no pulsations at all. The consistency of growths is firm and cannot be reduced in shape or size by pressure, as in the case of aneurysm.

Fig. 37.—Print of radiogram of the previous case.

Fig. 38.—Print of radiogram (anteroposterior plate) of previous case.

ACTINOMYCOSIS

Actinomycosis is a chronic, infectious disease occurring in cattle and man. The disease is usually very slowly progressive in character, lasting anywhere from many weeks to years. It starts usually with a small, nodular swelling and spreads to a fairly large edematous area (Fig. 40). Other nodules appear, and then they break down followed by suppuration and exudation of pus. These

Fig. 39.—Photograph of patient with aneurysm extending from inferior border of the mandible, to about two-thirds of the neck.

Fig. 40.—Photograph of patient with an actinomycosis. Notice the nodular arrangement, suppuration, and typical sinus formation.

edematous suppurating areas are then connected with sinuses. The thick exuding pus contains the "sulphur granules." Extreme patience and repeated microscopic examination of these granules will reveal the ray fungus, which will verify the clinical diagnosis.

Clinically, trismus may or may not be marked. The duration of the symptoms and the lack of response to incision and drainage, and finally the characteristic clinical picture of the disease, helps in the diagnosis. The laboratory findings will aid in differentiating this disease from tuberculosis, gumma, cellulitis, and a possible malignancy.

Fig. 41. Fig. 42.

Fig. 41.—Photograph of patient presenting with edema midway between maxilla and mandible. This swelling is the result of a fractured condyle.

Fig. 42.—Photograph of previous case showing difficulty in opening of mouth.

Fig. 43.—Photograph of patient with extensive case of osteomyelitis; external incision was necessary for added drainage.

FRACTURE

A patient may present with a marked edema, discoloration, pain, hemorrhage, and a history of a recent trauma. Such an individual may complain of the inability to close his or her mouth properly. These symptoms, and a history of a recent accident, lead the operator to suspect a possible fracture (Figs. 41 and 42). A careful clinical examination will furnish the following information.

1. A deformity is present with the improper alignment of the teeth.

2. Crepitation: a characteristic sound of broken bones rubbing against each other.

3. Loss of function. The patient can open his or her mouth but cannot bring the jaws together with any degree of force. The function of the jaws is absent.

4. A false point of motion, or a movement in a place other than the temporomandibular articulation, may be observed. This objective symptom is best detected by placing the index finger of each hand on the incisal or cutting edge of the teeth, with the thumbs under the mandible, and testing for a false point of motion.

The symptoms of this marked edematous condition are pathognomonic of a fractured jaw. The radiographs will confirm the clinical diagnosis and will also indicate the type of fracture present.

OSTEOMYELITIS

In postoperative conditions we find the usual symptoms of edema, redness, ecchymosis, and pain to a varying degree. Normally, with proper home and office treatment the edema is resolved and an uneventful recovery follows.

Many times, or rather too often, there is a history of surgical interference in these cases. The edema and pain increase, and we know clinically that this patient is suffering from an osteitis, that is an inflammation of the cortical or outer layer of bone. Osteitis may be present without any clinical evidence being apparent or discernible in the radiogram. As this condition progresses the end result is an acute osteomyelitis, an inflammation of the cancellous portion of the bone (Fig. 43).

An acute osteomyelitis may be present in the form of edema, tenderness upon pressure, general malaise, with a rise and fall of temperature, pain or partial luxation of teeth, but osteomyelitis cannot be diagnosed by means of the radiogram at this early stage. This is an important factor to keep in mind. As the disease progresses, while the pain and edema still persist, then and then only does the radiogram disclose small, dark areas, replacing the white network of the bone. The dark spaces are due to the enlargement of the marrow spaces. Then, the radiolucent areas become larger and fuse, black channels form which coalesce and surround areas of normal bone, which eventually become sequestra.

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Case Reports

A case kindly submitted for publication by Dr. Louis Gross is an excellent example to illustrate what an important influence a general disease of the skeleton may have in the practice of clinical dentistry.

Case reports for this department should be sent to Dr. Kurt H. Thoma, 53 Bay State Road, Boston, Mass.

CASE REPORT NO. 32

PAGET'S OSTEITIS DEFORMANS

LOUIS GROSS, D.D.S., PITTSFIELD, MASS.

Chief Complaint.—The patient, a white male aged 63 years, stated that he was unable to masticate food properly. He also had had dizziness for several months past.

History.—Family history was irrelevant. Past history revealed that the patient had had measles in early childhood and typhoid fever at the age of 12. After having had all his mandibular teeth extracted several years ago due to extensive caries, he had since worn a lower denture. Three weeks before the patient presented himself he had had the left superior molar removed.

Fig. 1. Fig. 2.

Figs. 1 and 2.—Paget's disease.

Present Illness.—The patient had first noticed a slight enlargement of the skull and maxilla fifteen years ago. Since then there was a gradual but definite increase in the size of the skull and maxilla. He never had had any pain as a result of this condition.

Physical Examination.—The skull showed definite enlargement and at its greatest circumference measured twenty-four inches. The surfaces were smooth, and protuberances were prominent on palpation. The chest was well formed; the heart showed no enlargement; there were no thrills and no murmurs. The blood pressure was 170 over 100. The legs were bowed (x-rays of the lower extremities unavailable).

Special Examination.—There was bilateral enlargement of the maxilla extending from one condyle to the other. The enlargement was so great that it was impossible for the patient to bring his lips together, as shown in Figs. 1 and 2. Intraoral examination revealed a marked bilateral symmetrical enlargement of the alveolar and palatal processes of the entire maxilla. The mucous membrane was stretched over this hard swelling and was highly inflamed in the incisal area (Fig. 3). The vessels were strictly distinct in this region. Several broken down teeth were present in the maxilla, some with large fillings and others with gold crowns. These teeth were firm in their sockets. There was evidence of recent removal of the maxillary left second molar. Examination of the socket gave one the impression that an unusual amount of bone had been removed with the tooth. The mandible appeared to be normal, and there were no teeth present.

Fig. 3.—Paget's disease, intraoral view.

Roentgen Examination of the Skull.—The x-ray shows definite thickening with hypertrophy and with many areas of rarefaction, giving the typical "cotton wool" appearance of Paget's disease, as shown in Fig. 4. The anteroposterior x-ray picture of the head shows all the facial bones similarly affected; the maxillary sinus on the left side is obliterated and on the right side partially obliterated, as shown in Fig. 5. The lateral jaw x-ray of the maxilla shows a mottled appearance of the bone with sclerotic changes.

The dental films show pathologic involvement of most of the remaining teeth. The bone about and above the teeth has the same appearance as described in the head and lateral jaw x-ray (Fig. 6). The complete roentgen examination of the head shows definitely an advanced case of Paget's disease.

Remarks.—The patient experienced difficulties with the lower denture on account of the progressive enlargement of the maxilla, because there was no

Fig. 4.

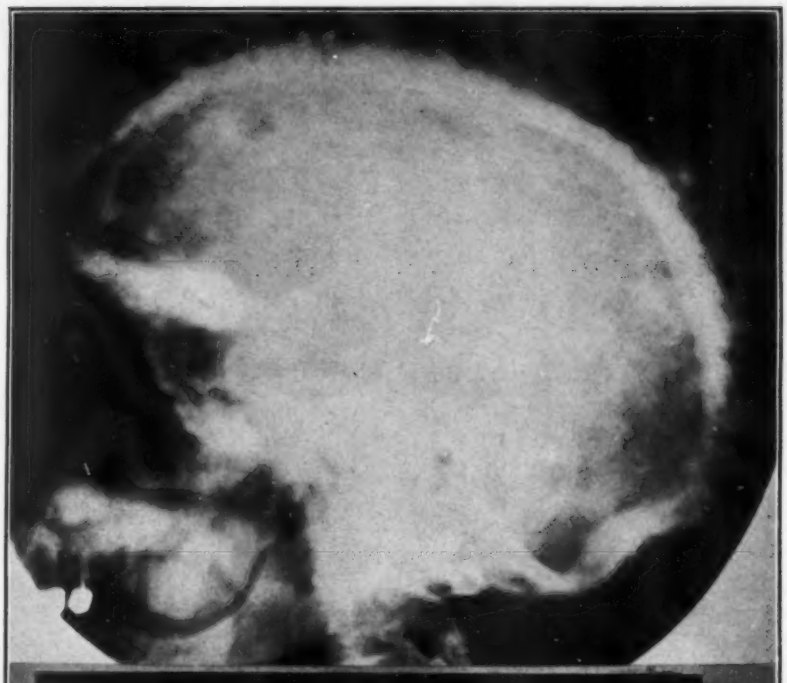

Fig. 5.

Fig. 4.—X-ray showing Paget's disease of the skull and maxilla, side view.
Fig. 5.—X-ray showing bone changes typical of Paget's disease of the skull and maxilla.

occlusion of the teeth of the denture with the maxillary teeth. Therefore the patient desired to have his maxillary teeth removed in order that he might have dentures made so as to enable him to masticate properly.

Fig. 6.—X-ray, intraoral view.

Treatment.—Due to the general physical condition of the patient, surgery of the jaw was contraindicated at the time. However, if the patient's condition improves sufficiently, then it will be advisable to remove the maxillary teeth and trim the alveolar bone, and construct a denture. If this is done, the patient's jaws will have to be carefully examined at regular intervals because a progressive enlargement must be expected, which will change the fit of the denture.

Department of Orthodontic Abstracts and Reviews

Edited by

Dr. J. A. Salzmann, New York City

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City.

A Modernised Expansion Plate Worn at Night Only: By O. Henry, L.D.S., R.C.S., *The Dental Record*, London, England **59**: 415-420, 1939.

Henry discusses the expansion plate as it is employed by Martin Schwarz of Vienna. The plate is worn at night only and by virtue of its construction becomes active during sleep.

The construction of the expansion plate is similar to that of the bite plate as it is generally used in America. The inclined plane on which the mandibular incisors occlude is made prominent enough to keep the maxillary and mandibular teeth farther apart during sleep than is customary. When the plate is worn at night, there is a natural tendency on the part of the child to force the plate upward so as to get the jaws closer together. At the same time, the lips are closed bringing nasal respiration into play. The action of the plate depends, therefore, upon muscular forces much as in the Andresen system. The difference being that in the Andresen system the child must keep the jaws together and the lips closed by voluntary effort which later becomes a postural reflex.

Schwarz employs a cribiform wire which fits into the buccal interproximate spaces of the teeth on the principle of the Crozat appliance. The difference here being that arrowlike extensions on the crib grip the two adjacent teeth at opposite points in the interproximate space.

In order to avoid sharp edges on molar clasps in connection with the expansion or split plate, Schwarz engages both ends of the molar clasp in the vulcanite making what is virtually a Gillett clasp.

Auxiliary springs are used with the vulcanite plate. The springs are imbedded in cement in the waxed denture prior to vulcanization. After the denture is vulcanized the cement is removed, and the spring is given free play. The gauges of the wire used in making the crib are 0.7, 0.5, 0.4, 0.3.

The Fischer expansion screw is used with the split plate. This allows one-fourth mm. expansion at each turn. A clamp is used for holding the expansion screw in place during vulcanization. The larger porton of the clamp extends above the wax and becomes imbedded in the top or reverse of the flask. After vulcanization the split in the plate is made by means of a saw. Splits can be made in the plate either anteroposteriorly for lateral expansion, or Y-shaped, employing two expansion screws, one in each of the arms of the Y, for general expansion. The expansion screws can also be inserted in the plate so as to produce labial movement of the anterior teeth or distal move-

ment of either or both of the lateral tooth segments. The labial wire crib can also be adjusted to produce individual movement of the incisors.

Schwarz asks: "How is it that this apparatus which is as old as the first artificial denture, certainly one hundred years old, and which during all this time has played a subordinate role to cemented appliances, should now be gaining ground, just at the time when our cemented appliances seem to have reached perfection? It is because, in spite of all progress, the inherent disadvantages of the cemented appliance remain. There is first the difficulty of their perfect adaptation and adjustment, again, the danger of the pressure becoming distorted, and then the inadvisability of applying pressure continually, danger of caries, and expense of material."

And so, the discussion of appliances continues without abatement in spite of the dictum originally pronounced by Angle that "An appliance is an instrument on which one can play many tunes." It would seem to this reviewer that diagnosis rather than the "system" employed in treatment should be uppermost in our minds at all times.

Acquired Prenormal Occlusion of the Mandible as the Result of Early Removal of the Deciduous Molars: By W. A. Sowden Hills, L.D.S. Eng., *The British Dent.* **67:** 180, 1939.

Examination of the mouths of children who have had their deciduous molars extracted and occasionally also their maxillary incisors, reveals many cases of forward movement of the mandibular arch. The mandibular deciduous canines are in mesial relation to the maxillary ones. Occasionally, the mandible, in endeavoring to find a position of rest, will go laterally usually to the right side, resulting in the establishment of a cross-bite. The lateral cross-bite position is more comfortable for the child than the protrusive position. Cases are presented showing that protrusion of the mandible can occur even when the maxillary incisors are present.

If these cases are left untreated a true prenormal position may develop. The author suggests that if the mandible can be retruded by manual means it is proof that the protrusion is an artificial one due to the loss of the deciduous molars and not a true prenormal inferior protrusion.

Other forms of irregularity that follow loss of deciduous molars are: (1) Spacing of maxillary incisor teeth due to distal drift of the deciduous canines. In these cases the laterals are everted labially and tend to rotate. (2) Mesial drift of the first permanent molars with crowding in the premolar region. These conditions are concomitant with the prenormal occlusion.

Etiologic factors producing an acquired prenormal occlusion are the following:

(a) *The occlusal plane of the deciduous teeth* is practically horizontal, making it possible in these cases for the child to protrude its mandible without opening its mouth.

(b) *Mastication is performed* by retrusion of the mandible to a normal position and away from the protrusive position into which it falls when the mouth is opened.

(c) *When all of the deciduous molars are lost* the mandibular canines ride forward in the attempt to obtain deeper occlusion with the maxillary ones, producing an acquired prenormal occlusion.

(d) *Where only the mandibular molars have been extracted* a definite prenormal occlusion results.

(e) *Where only the maxillary molars are extracted* we may have a pseudo-prenormal occlusion and the diagnostic test—attempts at manual retrusion of the mandible—will show that the mandible has not been protruded. If the permanent maxillary incisors are allowed to erupt lingually a true prenormal occlusion will result.

(f) If only the maxillary or mandibular deciduous first molars have been extracted the acquired prenormal occlusion will not show closure of the arches owing to the second deciduous molars continuing to maintain the occlusal height.

(g) Loss of all four deciduous first molars may produce one of the following: (1) distal drift of canines until the first molar space is eliminated, without production of an acquired prenormal occlusion. (2) The production of a prenormal occlusion or (3) the production of a pseudo-prenormal occlusion.

Where an infraclusion is present in combination with a prenormal occlusion, treatment consists in bringing the deciduous canines out of contact by the use of a bite plate or bite block, at least until the permanent molars come into occlusal contact. It should be kept in mind that prenormal occlusion is found only in some but not in all cases.

Dental Attrition: By Meyer Klatsky, *J. A. D. A.* **26**: 73, 1939.

Dental attrition is not a pathologic, but rather a physiologic process, the result of normal masticatory function. Function begets attrition. The two conditions are inseparable. There can be no attrition when the teeth do not function. The greater the function, the more extensive the attrition registered on the teeth. Therefore, attrition is the index of function, the yardstick by which function can be measured.

Dental attrition must be dissociated from dental diseases such as caries, erosion, and abrasion; especially must it be distinguished from abrasion, the latter being an unnatural condition resulting from tooth abuse from friction on the teeth by foreign bodies. The most important factors in tooth attrition and the amount of wear of the teeth are the physical nature of the food and the amount of stress exerted on and by the teeth during the process of mastication.

Dental attrition is prevalent in the teeth of savage and primitive tribes who subsist on a meat and fish diet, and it is characteristic also of the teeth of ancient and prehistoric peoples who used raw, natural foods for their sustenance. There is little evidence of attrition in the teeth of modern, civilized races, owing to the softness of foods used and the lack of function of the masticatory apparatus.

In exceptional cases among modern peoples, where the diet consists of hard, bulky fibrous foods a powerful, well-functioning masticatory apparatus is developed, the teeth manifest a good deal of attrition, resembling those of primitive peoples.

As to its relation to the health and disease of the teeth, dental attrition is divided into three stages, the physiologic or functional, when the teeth are in a clean and healthy condition, and the transitory, wherein the teeth begin to lose their immunity and pass to the next, the senile state, where the teeth are badly affected by disease which leads to their degeneration and disintegration.

Although properly functioning teeth are kept in a more hygienic and healthy state during the greater part of life, in more advanced age function tends to hasten the senile stage of attrition with its attendant pathologic involvements. On the other hand, teeth which do not function properly fall easy victims to dental caries and other degenerative disease very early in life. The greatest problem confronting the dental profession at the present moment is not how to combat dental attrition, but, on the contrary, how to promote functional activity of the masticatory apparatus, which is the greatest factor in the preservation of a healthy mouth and good teeth.

La Mélanodentie Infantile (Infant Melanodontia): By Géo Beltrami and Marc Romieu, *Revue de Stomatologie* **41**: 433, 1939.

Infant melanodontia occurs in children from one to three years of age, rarely later. It attacks primarily the maxillary incisors and very frequently only those but it may become generalized. Progress, though usually slow, may be very rapid and associated with sensitiveness during mastication. The disease begins most often as a minute punctiform lesion of the enamel on the middle part of the labial surface of the maxillary incisors. The opaque edge breaks gradually, thereby exposing the dentine which keeps its hardness but becomes increasingly darker in color until it is black. This pigmentation is due to a melanin-like compound insoluble in concentrated acids or any usual solvent (alcohol, ether, acetone, benzene, toluene, petroleum ether, xylol, carbon disulphide) and soluble in potassium hydroxide (1:5). It is characteristically decolorized by dilute hydrogen peroxide (1:20) and potassium permanganate (1:1,000) followed by consecutive treatment with oxalic acid. Tests for iron proved negative.

Histologic examination reveals: (1) Loss of the enamel cuticle. (2) The enamel is tinged yellow at the worn surface which presents a wavy contour. Prisms are abnormally visible and limited by a very clear dark line indicating decalcification chiefly on the interprismatic substance and sheaths. Brown spots are numerous, and frequently the neonatal line is extremely pronounced. (3) Adjacent to the enamel lesion, there is a thin layer of pigmented dentine, its normal structure being made only indistinctly visible because of the deposit of numerous crystals and globules. Then comes a thicker layer, dark brown or black in color, with almost normal structure except that the canals

are somewhat enlarged or slightly more tortuous, and the fundamental calcified substance is strewn with fine pigmented granules. This layer is followed by a less strongly colored band which exhibits hypertrophy of the fibers of Tomes and the sheaths of Neumann. Finally there is a translucent layer leading to practically normal dentine. (4) When the destruction of the crown is advanced, the intense reaction of the pulp leads to rapid formation of secondary dentine which finally fills the canal.

The authors recommend that the terms hypoplasia, odontoclasia, mottled enamel, be not applied to the disease. They stress that infant melanodontia involves a process of dental disintegration completely special in its beginning, localization, and evaluation and apparently attribute its etiology to the lack of vitamin C specifically, but think that the question is larger and concerns a veritable *nutritional unbalance*, that is an unbalance in general nutrition brought about by the combination of biologic and social conditions involving deficiency in oxygen, sunlight, exercise, etc.*

Frances Krasnow, Ph.D.

Book Reviews

Molding and Casting: Its Technic and Application for Moulage Workers, Sculptors, Artists, Physicians, Dentists, Criminologists, Craftsmen, Pattern Makers and Architectural Modelers. By Carl Dame Clarke, Associate Professor of Art as Applied to Medicine, University of Maryland School of Medicine, Pp. 308, Baltimore, 1938, The John D. Lucas Co.

The increase in popularity of facial esthetics as a desired end result in denture restoration, has given the making of facial casts, hitherto the concern of orthodontists, wider application in dental practice. Furthermore, with the use of moulages for the reproduction of dental pathosis as practiced by Daniel E. Ziskin of Columbia University and others, molding and casting has become a useful process in dentistry. The present volume presents the subject from a basic point of view. The techniques of molding and casting are here presented in detail and in the manner of a practical handbook. The chapter on Moulages of the Oral Cavity will be found a godsend by those interested in this method of presenting pathologic conditions of the oral cavity. Here, as throughout the book, the illustrations will be found especially helpful. The technique of making facial casts is presented in detail. The materials mentioned in the text may be made by the operator or purchased through the Warren-Knight Company, 136 North 12th Street, Philadelphia, Pa.

As here presented, molding and casting can be easily mastered by the dentist who possesses ordinary manual dexterity. The making of molds and casts, besides being of value for teaching purposes, is of importance also in obtaining permanent records for comparison of post-treatment results with original conditions.

*"Etc." is used in the original.

The Dentist Faces His Future: By George Wood Clapp, D.D.S., Pp. 231, Price $1.00, New York, The Dentists' Supply Co., 1939.

While we may not altogether agree with Clapp's philosophy we can hardly gainsay the incontrovertible facts which he so interestingly presents in his book. The economics of dental practice has drawn its exponents from among ethical practitioners, pseudo-ethical dentists, and frankly commercial sources. To the credit of Clapp be it said, he has never travelled under false colors. However, it is not altogether inconceivable that what is good for the dental trades may not in the long run also be to the best interests of the dentist and ultimately to the public. We have long held that the efficient conduct of private dental practice, usually discussed under the all inclusive term *dental economics* suffers more through the efforts of its apologists than through its frank proponents. Clapp belongs in the category of the latter.

A phase of dentist-dental trades relationship whose baneful influence has long been recognized by dental leaders is discussed by Clapp in the following terms: "They *(dentists)* are so accustomed to having dealers and laboratories do for them the things they ought long since have done for themselves that they are now confused and nearly helpless." But while admonishing dentists to be more self-reliant the author goes on to cite many examples of dentists who became successful, after years of stark failure, because they were wise enough to seek and follow the advice of dental dealers.

In the opinion of this reviewer, the proper and efficient conduct of an ethical dental practice is as much a part of the dental curriculum as are, for example, the subjects of root-canal therapy and denture prosthesis. Furthermore, these subjects when they are presented to the undergraduate should not be relegated to those who are at best unfamiliar with the conditions that face the young graduate in his struggle to establish himself in practice, but should be taught by competent, well-informed teachers who have demonstrated their special fitness to teach this basic phase of the art of dentistry. Until the foregoing is the rule, dentists young and old will do well to read and digest the contents of Clapp's work.

The Treatment of Fractures: By Charles Locke Scudder, A.B., Ph.B., M.D., F.A.C.S. Consulting Surgeon to the Massachusetts General Hospital; Formerly Assistant Professor of Surgery at the Harvard Medical School; Fellow American Surgical Association. Eleventh Edition, Revised with 1,717 Illustrations, Pp. 1,208, Philadelphia and London, 1939, W. B. Saunders Co.

The present edition, the eleventh since 1900, lists an imposing group of medical collaborators. Best known to oral surgeons and dentists are, of course, V. H. Kazanjian, M.D., D.M.D., Professor of Clinical Oral Surgery, Harvard Medical School, and Kurt H. Thoma, D.M.D., Professor of Oral Pathology, Harvard Medical School. While this work is one on the treatment of fractures in general, the dentist and oral surgeon will find his interest

centered mostly on the contribution of the above-named collaborators on fractures of the facial bones including nasal, malar and mandibular bones. Here the authors give a detailed description of the basic situations encountered in the treatment of fractures in the areas discussed. Intraoral and extraoral splinting is discussed and illustrated. This chapter is a veritable manual on the treatment of jaw fractures. The halftones and line drawings are highly interesting and instructive.

Editorial

Side Shows at the Meetings of the A. D. A.

The Annual Meeting of the A. D. A. is experiencing some of the same "growing pains" that have long been suffered by the American Medical Association. There are now so many and sundry peripheral organizations that have been organized as side attractions of the mother organization that the number of groups which are indirectly attached to the A. D. A. is becoming increasingly a problem of too many children for one parent.

To survey and take stock of the number of organizations that hold their annual get-togethers sometime during the same week in which the annual meeting of the A. D. A. is held is illuminating. It has been noted on occasions that members who are officers of, or who are particularly active members in, one or more of these fringe organizations, have little or no time to devote to the activities of the A. D. A. or to attend its sessions and, in some instances, the interests of the A. D. A. are secondary in the minds of individuals as compared to the activities of the subsidiary groups in whose meetings they may be particularly interested.

It has been both said and written that orthodontists are really the first group that started all the ruckus about dividing dentistry up into pieces, when they decided to organize their own specialty societies for the study of orthodontics about forty years ago. This observation may be partly true. Notwithstanding, it is fortunate for the specialty of orthodontics that this happened, because to backtrack the orthodontic record it is observed that these special organizations for the study of orthodontics have contributed, it is safe to say, 95 per cent of the printed record of the steady advance of this specialty in America, since the time modern orthodontics first started to attract attention as a meritorious service.

In order that the record may be kept straight about orthodontic specialty groups, however, one thing may be truthfully said: the annual meetings of the orthodontic societies of America have not interfered, in all these years, with the sessions of the A. D. A. for the simple reason that these orthodontic meetings, for the most part, have been held at different times of the year and in different cities and apart from the annual meetings of the A. D. A. Accordingly they have not caused the slightest static with either the activities or the morale of the mother organization, and that should be put in the record.

The A. D. A. cannot tell an independent dental group not to hold its annual meeting at the same time, city, and place where the A. D. A. meeting is held, for the simple reason that it cannot tell any organization where and when it must hold its meetings. It seems, however, that a policy can be pursued similar to that adopted by the A. M. A. under the same set of circumstances. A few years ago the A. M. A. found that there were so many fringe medical groups

holding their meetings in the same city and on the same dates as the meeting of the A. M. A. that there developed serious interference with the program of the A. M. A. This organization now makes quite some effort to discourage the meetings of a large number of outside medical groups at the same city, date, and place as the mother organization.

It seems the time has arrived when the A. D. A. should do likewise and give serious thought to the identical situation that brought about the medical confusion. An interview with the chairman of the Committee on Associated Groups of almost any annual meeting of the A. D. A. held recently will disclose a confusion of conflicting interests, a competitive race for space and rooms in hotels for organized fraternities, alumni societies, groups for the study of various phases of the profession. It is revealing to see just how far the ramifications of varied outside interests in dentistry extend and, in some cases, are in direct conflict with the real purpose in hand which after all it is understand is the holding of a successful meeting of the A. D. A. for the advancement of dentistry at large. Something should be done that would tend to direct the main interest of all who attend the A. D. A. meetings each year to one big purpose in hand.

A classical example of the failure of a profession to pull together 100 per cent for a common purpose is the divergent positions taken on the subject of socialized medicine by the A. M. A. and the American College of Surgeons. Front page news was the result; the doctors, divided among themselves, made good copy for the newspapers, but not for the doctors. The side-show trend that tends to eclipse the main attraction at the meetings of the A. D. A. should be discouraged.

H. C. P.

News and Notes

American Association of Orthodontists

The Thirty-Eighth Annual Meeting of the American Association of Orthodontists will be held in Chicago, Ill., May 13 to 16, 1940, at the Edgewater Beach Hotel. All ethical members of the dental profession are invited.

CLAUDE R. WOOD, Secretary-Treasurer,
608 Medical Arts Building,
Knoxville, Tenn.

Southern Section of the Pacific Coast Society of Orthodontists

The Southern Section of the Pacific Coast Society of Orthodontists met at the University Club, Los Angeles, June 9, 1939. Dr. Hays Nance was chairman of the meeting.

Dr. John Taylor reported on the progress of Assembly Bill 1707 which legalized excusing children from school for dental appointments and described his experience before the Assembly Committee. To date the bill has met the approval of both Assembly and Senate Committees.

Dr. Fred McIntosh reported in detail the proceedings of the American Association of Orthodontists meeting in Kansas City.

Dr. James McCoy presented several illustrated case reports in which he demonstrated the use of a definite outline for case reports.

Central Section of the Pacific Coast Society of Orthodontists

The Central Section of the Pacific Coast Society of Orthodontists met in Solari's Grille, San Francisco, June 13, 1939.

Dr. Sheffer gave a comprehensive and interesting report on the proceedings of the Kansas City meeting.

Dr. Stryker read a paper on Ethics, which he followed with a few comments on the method of charges for orthodontic treatment. Dr. Sweet opened a discussion on fees, with remarks concerning particularly the yearly charge. Dr. Hahn explained the merits of a fixed charge. A general discussion followed during which Dr. E. Lussier raised the question of a fee for consultation.

Dr. Sweet read a paper on the Graphic Distribution of Orthodontists in the United States.

Chicago Dental Society

The Chicago Dental Society will hold its 1940 midwinter meeting February 12 to 15, inclusive, at the Stevens Hotel, according to an announcement by Dr. Harold W. Welch, president.

Massachusetts Dental Society

The next annual meeting of the Massachusetts Dental Society will be held at the Hotel Statler, Boston, April 22 to 25, 1940. Dr. William H. Griffin, 520 Beacon Street, Boston, is president, and Dr. Philip E. Adams, 106 Marlborough Street, Boston, is secretary.

British Society for the Study of Orthodontics

A meeting of the British Society for the Study of Orthodontics will be held on Dec. 4, 1939, at Manson House, 25 Portland Place, W. I., London, England. Mr. P. G. Capon will present a paper on "Submerged Molars."

Notes of Interest

Dr. Fred E. Haberle announces the opening of a suburban office in Suite 4-5 First National Bank Building, 101 S. Washington Street, Hinsdale, Ill. He will retain his Chicago office in Suite 1916 Pittsfield Building, 55 E. Washington Street. Practice limited to orthodontics.

Dr. Fred E. McIntosh announces the removal of his offices from 1233 Roosevelt Bldg. to 1158 Roosevelt Bldg. and also the opening of additional offices in the Wilshire-La Brea Bldg., 700 S. La Brea. Orthodontics exclusively.

OFFICERS OF ORTHODONTIC SOCIETIES*

American Association of Orthodontists

President, William A. Murray - - - - - - - - - - - - - - - - - - Evanston, Ill.
Secretary-Treasurer, Claude R. Wood - - - - - - - - - - - - - Knoxville, Tenn.

Central Association of Orthodontists

President, Max E. Ernst - - - - - - - - - - - - - - - - - - - St. Paul, Minn.
Secretary-Treasurer, L. B. Higley - - - - - - - - - - - - - - - Iowa City, Iowa

Great Lakes Association of Orthodontists

President, Ira A. Lehman - - - - - - - - - - - - - - - - - - - Detroit, Mich.
Secretary-Treasurer, Richard E. Barnes - - - - - - - - - - - - Cleveland, Ohio

New York Society of Orthodontists

President, Franklin A. Squires - - - - - - - - - - - - - - - White Plains, N. Y.
Secretary-Treasurer, William C. Keller - - - - - - - - - - - - New York, N. Y.

Rocky Mountain Society of Orthodontists

President, Leonard T. Walsh - - - - - - - - - - - - - - - - - Pueblo, Colo.
Secretary-Treasurer, George Siersma - - - - - - - - - - - - - Denver, Colo.

Southern Society of Orthodontists

President, A. C. Broussard - - - - - - - - - - - - - - - - - New Orleans, La.
Secretary-Treasurer, T. C. Sparks - - - - - - - - - - - - - - Columbia, S. C.

Southwestern Society of Orthodontists

President, J. H. Weaver - - - - - - - - - - - - - - - - - - - Houston, Texas
Secretary-Treasurer, R. E. Olson - - - - - - - - - - - - - - - Wichita, Kan.

Pacific Coast Society of Orthodontists

President, Will G. Sheffer - - - - - - - - - - - - - - - - - - San Jose, Calif.
Secretary-Treasurer, Earl F. Lussier - - - - - - - - - - - - - San Francisco, Calif.

American Board of Orthodontics

President, Harry E. Kelsey - - - - - - - - - - - - - - - - - - Baltimore, Md.
Secretary, Charles R. Baker - - - - - - - - - - - - - - - - - - Evanston, Ill.
Treasurer, Bernard G. DeVries - - - - - - - - - - - - - - - - Minneapolis, Minn.
William E. Flesher - - - - - - - - - - - - - - - Oklahoma City, Okla.
Frederic T. Murlless, Jr. - - - - - - - - - - - - - - - - - Hartford, Conn.
Oliver W. White - Detroit, Mich.
James D. McCoy - Los Angeles, Calif.

Foreign Societies†

British Society for the Study of Orthodontics

President, S. A. Riddett
Secretary, R. Cutler
Treasurer, H. R. Evans

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*The Journal will make changes or additions to the above list when notified by the secretary-treasurer of the various societies. In the event societies desire more complete publication of the names of officers, this will be done upon receipt of the names from the secretary-treasurer.

†The Journal will publish the names of the president and secretary-treasurer of foreign orthodontic societies if the information is sent direct to the editor, 8022 Forsythe, St. Louis, Mo., U. S. A.